

AD-A160 605

INTERACTIVE GRAPHICS UTILITY FOR ARMY NEC (NUMERICAL  
ELECTROMAGNETICS COD. (U) SYSTEM DEVELOPMENT CORP SAN  
DIEGO CA J STRAUCH ET AL. SEP 85 NOSC-CR-308

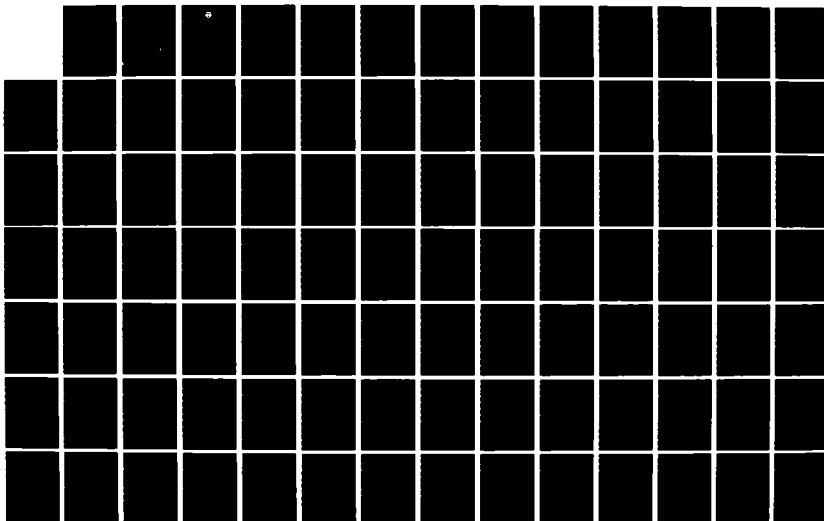
1/2

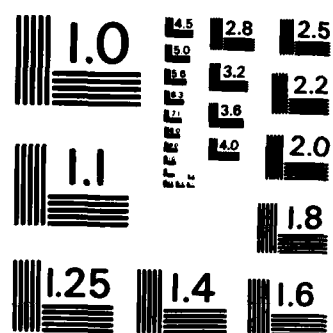
UNCLASSIFIED

N66001-83-D-0094

F/G 9/2

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

AD-A160 605

**Contractor Report 308**

September 1985

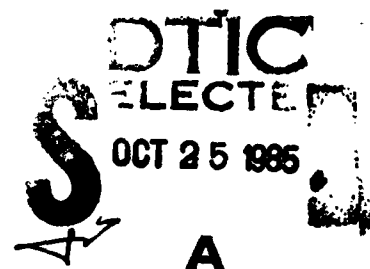
**INTERACTIVE GRAPHICS UTILITY FOR  
ARMY NEC AUTOMATION (IGUANA)**

User's Guide

J. Strauch

S. Thompson

System Development Corporation



---

**Naval Ocean Systems Center** San Diego, California 92152-5000

Approved for public release;  
distribution unlimited.

The views and conclusions contained in  
this report are those of the authors and  
should not be interpreted as representing  
the official policies, either expressed or  
implied, of the Naval Ocean Systems  
Center or the U.S. Government.

85 10 25 021

FILE COPY



NAVAL OCEAN SYSTEMS CENTER SAN DIEGO, CA 92152

---

**F. M. PESTORIUS, CAPT, USN**

Commander

**R.M. HILLYER**

Technical Director

**ADMINISTRATIVE INFORMATION**

This document was prepared to explain the capabilities, functions, and operation of IGUANA. The work was done under the direction of Code 822, J. C. Logan for the Naval Ocean Systems Center.

Released by  
I. C. Olson, Head  
Antenna and RF Systems  
Integration Branch

Under authority of  
G. E. Ereckson, Head  
Shipboard Systems  
Division

UNCLASSIFIED

**REPORT DOCUMENTATION PAGE**

REPORT DOCUMENTATION PAGE				
1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b RESTRICTIVE MARKINGS AD-A160605		
2a SECURITY CLASSIFICATION AUTHORITY		3 DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.		
2b DECLASSIFICATION / DOWNGRADING SCHEDULE		5 MONITORING ORGANIZATION REPORT NUMBER(S) NOSC CR 308		
4 PERFORMING ORGANIZATION REPORT NUMBER(S)		7a NAME OF MONITORING ORGANIZATION Naval Ocean Systems Center		
6a NAME OF PERFORMING ORGANIZATION System Development Corporation		6b OFFICE SYMBOL (if applicable) 614		7b ADDRESS (City, State and ZIP Code) Code 822 San Diego, CA 92152-5000
6c ADDRESS (City, State and ZIP Code) 4065 Hancock Street San Diego, CA 92110		9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N66001-83-D-0094		
8a NAME OF FUNDING / SPONSORING ORGANIZATION Space and Naval Warfare Systems Command		10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO 62543N PROJECT NO CM41 TASK NO Agency Accession DN088509		
8b ADDRESS (City, State and ZIP Code) Washington, D.C. 20363-5100		11 TITLE (Include Security Classification) INTERACTIVE GRAPHICS UTILITY FOR ARMY NEC AUTOMATION (IGUANA) User's Guide		
12 PERSONAL AUTHOR(S) J. Strauch and S. Thompson				
13a TYPE OF REPORT Final		13b TIME COVERED FROM May 1985 TO May 1985		14 DATE OF REPORT (Year, Month, Day) September 1985
15 PAGE COUNT 130				
16 SUPPLEMENTARY NOTATION				
17 COSATI CODES FIELD GROUP SUB-GROUP		18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Numerical Electromagnetics Code (NEC) Subjects DOS		
19 ABSTRACT (Continue on reverse if necessary and identify by block number)  The Interactive Graphics Utility for Army NEC Automation (IGUANA) is a system designed to reduce the time required for antenna model evaluation by providing partial automation to both the data entry and the data display processes.				
20 DISTRIBUTION / AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS		21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED		
22a NAME OF RESPONSIBLE INDIVIDUAL J. C. Logan		22b TELEPHONE (Include Area Code) (619) 225-2646		22c OFFICE SYMBOL Code 822

# TABLE OF CONTENTS

		<u>Page</u>
SECTION 1.	INTRODUCTION . . . . .	1-1
1.1	General . . . . .	1-1
1.1.1	Background . . . . .	1-1
1.1.2	System Limitations . . . . .	1-1
1.2	System Summary . . . . .	1-2
1.3	System Functions . . . . .	1-3
1.3.1	Function 1 - CARD EDITOR . . . . .	1-4
1.3.2	Function 2 - MODEL MAKER . . . . .	1-5
1.3.3	Function 3 - SET DEFAULT VALUES . . . . .	1-6
1.3.4	Function 4 - CROSSTALK - Transfer Files to/from Another Computer . . . . .	1-6
1.3.5	Function 5 - Plot Utilities . . . . .	1-7
1.3.6	Function 6 - Auxiliary Programs . . . . .	1-7
1.3.7	Function 7 - EXIT TO DOS . . . . .	1-7
SECTION 2.	DEFINITIONS AND APPLICABLE DOCUMENTS . . . . .	2-1
2.1	System Terminology and Definitions . . . . .	2-1
2.2	Applicable Documents . . . . .	2-3
SECTION 3.	SYSTEM REQUIREMENTS AND START-UP . . . . .	3-1
3.1	General . . . . .	3-1
3.2	Equipment Requirements . . . . .	3-1
3.3	System Start-Up . . . . .	3-2
SECTION 4.	INFORMATION ENTRY AND FUNCTION KEY USE . . . . .	4-1
4.1	General . . . . .	4-1
4.2	Data Entry Information . . . . .	4-1
4.2.1	VDT Keyboard Input . . . . .	4-1
4.2.2	Digitizer Input . . . . .	4-3
4.2.3	Mouse Input . . . . .	4-6
4.3	Function Key Use . . . . .	4-7
SECTION 5.	SYSTEM OPERATION . . . . .	5-1
5.1	General . . . . .	5-1
5.2	Presentation . . . . .	5-1

## TABLE OF CONTENTS (cont.)

	<u>Page</u>
5.3            Functional Description and Operating Procedures . . .	5-1
5.3.1        CARD EDITOR Function . . . . .	5-1
5.3.1.1      Option 1 - CREATE NEW NEC INPUT DECK . . . . .	5-6
5.3.1.1.1    Creating Comment Cards . . . . .	5-8
5.3.1.1.2    Creating Geometry Cards (Prompted Mode) . . .	5-10
5.3.1.1.3    Creating Program Control Cards (Prompted Mode)	5-13
5.3.1.1.4    Creating Geometry/Program Control Cards (Nonprompted Mode) . . . . .	5-15
5.3.1.2      Option 2 - EDIT EXISTING DECK . . . . .	5-16
5.3.1.3      Option 3 - COPY and RENAME EXISTING DECK . . . .	5-21
5.3.1.4      Option 4 - DISPLAY EXISTING DECK . . . . .	5-23
5.3.1.5      Option 5 - DELETE EXISTING DECK . . . . .	5-25
5.3.1.6      Option 6 - NEC INPUT DECK MAINTENANCE . . . . .	5-27
5.3.1.6.1     Formatting a Deck for Input to NEC . . . . .	5-27
5.3.1.6.2     Displaying/Printing a NEC Input Deck . . . . .	5-29
5.3.1.6.3     Deleting a Formatted Deck . . . . .	5-30
5.3.1.6.4     Appending to a Formatted Deck . . . . .	5-31
5.3.1.6.5     Editing a Formatted Deck . . . . .	5-34
5.3.1.6.6     Preparing a Deck for Transmission . . . . .	5-34
5.3.1.6.7     Deleting a Transmit Deck . . . . .	5-36
5.3.1.6.8     Translating a File from Another Source . . . . .	5-37
5.3.1.7      Option 7 - DISPLAY DECK FILE STATUS . . . . .	5-38
5.3.1.8      Option 8 - DISPLAY/UPDATE NEC HOST TABLE . . . .	5-40
5.3.1.9      Option 9 - ARCHIVE/RESTORE DECKS . . . . .	5-42
5.3.1.9.1     Writing Deck(s) to a Floppy Disk (Archiving) .	5-43
5.3.1.9.2     Restoring Deck(s) to the Fixed Disk. . . . .	5-45
5.3.2        MODEL MAKER Function . . . . .	5-46
5.3.2.1      Option 1 - ENTER NEW MODEL . . . . .	5-47
5.3.2.1.1     Enter Structure Data . . . . .	5-49
5.3.2.1.2     Enter Tower Data . . . . .	5-57
5.3.2.1.3     Enter Pole Data . . . . .	5-59
5.3.2.2      Option 2 - WORK WITH OLD MODELS . . . . .	5-61
5.3.2.2.1     2-VIEW File Operations . . . . .	5-63
5.3.2.2.2     SECTIONS File Operations . . . . .	5-67
5.3.2.2.3     3-D SECT NO EDIT File Operations . . . . .	5-69
5.3.2.2.4     3-D SECT EDITED File Operations . . . . .	5-72

# TABLE OF CONTENTS (cont.)

		<u>Page</u>
5.3.2.2.5	MODEL File Operations . . . . .	5-73
5.3.2.3	Option 3 - BUILD MODEL FROM GEOMETRY CARDS . . .	5-85
5.3.2.4	Option 4 - ARCHIVE/RESTORE MODELS . . . . .	5-86
5.3.2.4.1	Writing Model(s) to a Floppy Disk (Archiving). .	5-86
5.3.2.4.2	Restoring Model(s) to the Fixed Disk . . . . .	5-87
5.3.3	SET DEFAULT VALUES Function . . . . .	5-87
5.3.4	CROSSTALK - Transfer Files to/from Another Computer . . . . .	5-91
5.3.5	Plot Utilities . . . . .	5-94
5.3.6	Auxiliary Programs . . . . .	5-95
5.3.7	EXIT TO DOS . . . . .	5-96
APPENDIX A	CROSSTALK COMMAND AND SCRIPT FILES . . . . .	A-1
APPENDIX B	SYSTEM INSTALLATION GUIDE. . . . .	B-1



Accession For	
INTIS CD-ROM	<input checked="" type="checkbox"/>
ETIC TA	<input type="checkbox"/>
Unan	
Justic	
By	
Date	
Title	
Author	
Subject	
Notes	

*A-1*



# TABLE OF CONTENTS (cont.)

## LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
3-1	Power and Peripherals Connections . . . . .	3-3
5-1	Master Menu . . . . .	5-2
5-2	Subdecks and Filenames . . . . .	5-3
5-3	CARD EDITOR Option Menu . . . . .	5-7
5-4	Create Comment Cards: First-Level Edit Function Key Display . . . . .	5-9
5-5	Create Geometry Cards (Prompted Mode) . . . . .	5-11
5-6	Create Program Control Cards (Prompted Mode) . . . . .	5-14
5-7	Edit Existing Deck: First-Level Edit Function Key Display . . . . .	5-18
5-8	Edit Existing Deck: Second-Level Edit Function Key Display . . . . .	5-20
5-9	Appending Structures for NEC Input . . . . .	5-33
5-10	File Status Display Printout . . . . .	5-39
5-11	Hidden and End-On Wires . . . . .	5-51
5-12	Section Boundaries . . . . .	5-51
5-13	Drawing Placement for Tower Input . . . . .	5-58
5-14	Sample End View Generation Problem . . . . .	5-64
5-15	Rotation Control . . . . .	5-75
5-16	Adding Wires to a Structure . . . . .	5-79
5-17	Digitizer Tolerance Illustration . . . . .	5-91
A-1	Sample Command File . . . . .	A-3
A-2	Sample Script File . . . . .	A-6

## SECTION 1. INTRODUCTION

### 1.1 General

1.1.1 Background. The Interactive Graphics Utility for Army NEC Automation (IGUANA) is a system designed to reduce the time required for antenna model evaluation by providing partial automation to both the data entry and the data display processes.

Previous to this system, the use of existing Numerical Electromagnetics Code (NEC) for antenna evaluation required a lengthy, tedious and error-prone process involving manual measurement of three-dimensional coordinates of each significant point of the desired input structure from scale drawings (generally only Top and Side Views are available), and manual entry via keyboard. The input structures are in the form of 'wire' models. The NEC code requires that each wire be entered individually with both end points, radius and segmentation. Complex models often required several weeks of effort to correct measurement and keyboard errors.

IGUANA is provided as an aid to NEC input preparation and output display - it performs no antenna evaluations itself. Therefore, this User's Guide must be used in conjunction with NOSC TD 116 Vols 1-3 (Numerical Electromagnetics Code (NEC) - Method of Moments), which describe the use of the various Comment, Geometry, and Program Control data sets. This User's Guide has been prepared to explain the capabilities, functions, and operation of IGUANA. ←

1.1.2 System Limitations. Version 2 of the IGUANA system is designed to aid in the preparation and display of data sets used as input to the NEC - Method of Moments code currently running on the NOSC Code 81 VAX as NEC3.

IGUANA is a composite of independently developed subsystems, some of which are individually copyrighted and do not fall under public domain. CROSSTALK has been copyrighted by MICROSTUF, Inc. and is licensed for use on a single computer. Problems and/or errors encountered while using CROSSTALK cannot be addressed by the NOSC IGUANA development team.

1.2 System Summary. The purpose of IGUANA is to aid the NEC user in the preparation of data sets for input to NEC and to provide a capability for displaying NEC output. The IGUANA data input procedures consist of the following:

- a. Creation of a three-dimensional model
  1. Structure definition - user input via digitizer of Top and Side Views of a structure
  2. Program editing of input data for consistency
  3. User definition of sections along the long axis of the structure
  4. User edit, via mouse, of tentative End Views of each section of the structure
  5. Program generation of a three-dimensional structure for each section and combination of all sections into a completed structure
  6. Displays of the entire structure with the capability of rotation of the entire structure and magnification of selected portions (zooming)
  7. User removal, via mouse, of undesired points and wires
  8. User addition, via mouse, of desired wires
- b. Generation of a set of wire cards representing the three-dimensional model
  1. Use of user-defined default values for wire radius, segmentation ratio and automatic wire-tagging (if desired)
  2. Generation of a card describing the three coordinates of each of the two endpoints for each wire in the three-dimensional structure; use of the default values to complete the required information on each of the wire cards
  3. Saving of the wire cards in a user-named Geometry data set (Geometry subdeck)
- c. User entry and maintenance of other required NEC input information
  1. Creation of Comment data sets (subdecks)
  2. Creation of Program Control data sets (subdecks)
  3. Stand-alone creation of Geometry data sets (subdecks)
  4. Editing, printing and deletion (upon user request) of any existing Comment, Geometry, or Program Control subdecks
  5. Formatting (combining) of Comment, Geometry, and Program Control subdecks in preparation for input to NEC

- 6. Translation of data sets to a sequential file for transmission to NEC host
- d. Transmission of formatted data sets to NEC host
- e. Capture and display of NEC output
- f. MININEC (Mini-Numerical Electromagnetics Code) - a method of moments code for the analysis of thin wire antennas

The user is guided in the use of the system functions by way of interactive dialogues and menus presented via CRT display. All system functions can be accessed by following the input prompts displayed on the screen.

1.3 System Functions. The system consists of these primary functions:

- a. CARD EDITOR - Aids user in creation, editing, deletion, printing, formatting and transmission of NEC input decks.
- b. MODEL MAKER - Used to generate/edit/display a three-dimensional model and produce a deck of wire cards.
- c. SET DEFAULT VALUES - Allows user to specify default values to be used when generating wire cards; these include wire radius, segmentation ratio, starting tag number, tag increment (for automatic wire tagging, if desired) and digitizer tolerance value.
- d. CROSSTALK - Transfers Files to/from another computer - Allows user selection of computer and enables automatic dial-up, log-on and file transfers to or from the selected computer.
- e. Plot Utilities - Displays/plots NEC input data sets/NEC run results.
- f. Auxiliary Programs - Allows user access to MININEC and any miscellaneous programs from a sub-menu. By adding to this sub-menu, the user can provide for easy access to any programs of his own. MININEC provides a method of moments computer code for the analysis of thin wire antennas to solve for impedance and current on arbitrarily oriented wires.
- g. EXIT TO DOS - Provides a means for the user to return to the DOS level to perform functions not provided by the system.

Menus are organized in levels - the seven primary functional areas described above being the highest level, the Master Menu. When the operator selects a function from the Master Menu, an appropriate Option Menu (second level) is

presented on the screen. Some options are further broken down and Sub-Option Menus are displayed for user selection. The function, option, and sub-option selections provided by the system are described in the following paragraphs.

#### 1.3.1 Function 1 - CARD EDITOR

Option 1 - CREATE NEW NEC INPUT DECK

Sub-Option 1 - COMMENT CARDS

2 - GEOMETRY CARDS

3 - PROGRAM CONTROL CARDS

Option 2 - EDIT EXISTING DECK

Sub-Option 1 - COMMENT CARDS

2 - GEOMETRY CARDS

3 - PROGRAM CONTROL CARDS

Option 3 - COPY and RENAME EXISTING DECK

Sub-Option 1 - COMMENT CARDS

2 - GEOMETRY CARDS

3 - PROGRAM CONTROL CARDS

Option 4 - DISPLAY EXISTING DECK

Sub-Option 1 - COMMENT CARDS

2 - GEOMETRY CARDS

3 - PROGRAM CONTROL CARDS

4 - ALL of the above

Option 5 - DELETE EXISTING DECK

Sub-Option 1 - COMMENT CARDS

2 - GEOMETRY CARDS

3 - PROGRAM CONTROL CARDS

4 - ALL of the above

Option 6 - NEC INPUT DECK MAINTENANCE

Sub-Option 1 - FORMAT DECK FOR NEC INPUT

2 - DISPLAY FORMATTED DECK

- 3 - DELETE FORMATTED DECK
- 4 - APPEND TO FORMATTED DECK
- 5 - EDIT FORMATTED DECK
- 6 - PREPARE DECK FOR TRANSMISSION
- 7 - DELETE TRANSMIT DECK (Sequential File)
- 8 - TRANSLATE FILE FROM OTHER SOURCE (Sequential File to Formatted Deck)

Option 7 - DISPLAY DECK FILE STATUS

Option 8 - DISPLAY/UPDATE NEC HOST TABLE

Option 9 - ARCHIVE/RESTORE DECKS

1.3.2 Function 2 - MODEL MAKER. The MODEL MAKER function does not lend itself to hierarchical menu displays like the CARD EDITOR function. There are four primary options:

- 1 - ENTER NEW MODEL
- 2 - WORK WITH OLD MODEL
- 3 - BUILD MODEL FROM GEOMETRY CARDS
- 4 - ARCHIVE/RESTORE MODELS

Option 1 (ENTER NEW MODEL) guides the user through the creation of Towers, Poles, or Structures (defined in Section 5.3.2) in order to generate three-dimensional figures and corresponding wire cards to be saved in a Geometry subdeck.

During model creation, a series of data files is generated for Top and Side Views, section data, edited and unedited three-dimensional section data, and three-dimensional model data.

Option 2 (WORK WITH OLD MODEL) allows the user to display, plot and edit the data saved in the various model data files.

Option 3 (BUILD MODEL FROM GEOMETRY CARDS) allows the user to create a three-dimensional model from a NEC data set of Geometry Cards.

Option 4 (ARCHIVE/RESTORE MODELS) allows the user to selectively save models on a floppy disk and restore previously saved models onto the system disk.

#### 1.3.3 Function 3 - SET DEFAULT VALUES

- a. Wire Radius - The wire radius set in the default table is used by the system when generating the wire cards from the three-dimensional wire structure and when creating Geometry Cards in the manual (stand-alone) mode.
- b. Segments per Meter - The segments per meter default value set in the default table is used by the system when generating the wire cards from the three-dimensional wire structure and when creating Geometry Cards.
- c. Tag Start and Tag Increment - Tag start and tag increment are used for automatic tagging when generating the wire cards from the three-dimensional wire structure and when creating Geometry Cards in the manual (stand-alone) mode.
- d. Units used in Original Drawing - Toggles between METERS, FEET, and INCHES to define the digitizer input of the original drawing. The system always uses meters for all further processing.
- e. Point Entry Tolerance in Digitizer Units - The digitizer tolerance sets the limits within which digitizer entries are identified as a point. Larger tolerances allow less precise input; however, discrimination between two points is reduced.
- f. Digitizer Available - Toggles between YES and NO to set availability status of digitizer.
- g. Plotter Speed/Available - Toggles between SLOW, FAST, and NO to set the availability status/speed of the plotter. SLOW speed is best for transparencies and for use with worn pens.
- h. Installation (Label for Plots) - The user may specify the label to be printed on plotter output.

1.3.4 Function 4 - CROSSTALK - Transfer Files to/from Another Computer. This function allows the user to select from a user-maintained list of mainframe computers and associated CROSSTALK Command and Script files and invokes CROSSTALK (a smart terminal and file transfer program) with the selected Command file name. Command and Script files can be created to automate computer dial-up, log-on, and file transfer procedures (refer to Appendix A).

Function 4 has no option or sub-option menus. CROSSTALK menus, functions, and operating procedures are described in the CROSSTALK-XVI documentation (refer to Section 2.2).

1.3.5 Function 5 - Plot Utilities. Plot Utilities are included with IGUANA to plot NEC input and run results.

1.3.6 Function 6 - Auxiliary Programs. A sub-menu has been created which allows access to MININEC, miscellaneous programs, and any programs the user might want to add for the convenience of easy access. MININEC is a method of moments computer code used for the analysis of thin wire antennas to solve for impedance and currents on arbitrarily oriented wires, including configurations with multiple wire junctions. MININEC operating procedures are documented under separate cover (refer to Section 2.2).

Included with the Auxiliary Programs are a MININEC Pre-Processor to process the Geometry Cards of a NEC Input Data Set through MININEC, a MININEC Post-Processor to interface the MININEC output with the Plot Utilities, and an Antenna Network Matching Program which produces Smith Charts.

1.3.7 Function 7 - EXIT TO DOS. This function provides a means for the user to exit cleanly from the IGUANA system to the DOS level to perform functions not available through IGUANA. There are no menus associated with this function and all DOS commands and functions are described in the DOS manual provided with the user's computer.



## SECTION 2. DEFINITIONS AND APPLICABLE DOCUMENTS

### 2.1 System Terminology and Definitions

- < > - Anything between these brackets refers to a key on the keyboard; for example, <End> and <Esc>.
- < ? > - The HELP key; used to request help on input for some system functions (not yet totally implemented).
- <Alt> - The ALTERNATE key; not currently used.
- <Caps Lock> - This key is automatically toggled ON when first starting up, to ensure that all user input is entered in upper case only. Most system processes translate and echo lower case characters as upper case (a notable exception is the CARD EDITOR's Option 2 Edit Deck).
- <Ctrl> - The CONTROL key; not currently used.
- <Esc> - The ABORT key; when pressed, the current process is halted and processing resumes at a previous menu level. Generally, input and calculations are lost.
- <Num Lock> - Many system functions use the cursor control (arrow) keys which are active only when <Num Lock> is OFF. When the system is first booted or reset, <Num Lock> is OFF.
- <RETURN> - The < ↵ > or ENTER key - also referred to in this document as <CR>.
- cards/  
card image - Refers to a single string of data to be sent to the NEC program. Each string starts with a two-character card code and several data items defining the data to be processed, or how that data is to be processed by the NEC program. Card types are Comment, Geometry, and Program Control Cards.

- Command file - Special purpose file used by CROSSTALK to set communications parameters for a particular mainframe computer (see Appendix A).
- CROSSTALK - A stand-alone smart terminal and file transfer package incorporated into IGUANA to provide a computer-to-computer communications capability.
- deck/subdeck - A subdeck is a NEC data set, consisting of one or more card images each with a card code as its first two characters. The user specifies a name for a subdeck (DECKX, for example) and specifies the card type to be created for CARD EDITOR Option 1. A Comment subdeck, a Geometry subdeck, and a Program Control subdeck can be created with the same deck name. (These subdecks are actually saved in separate files on the disk.) If all three subdeck types exist for a given name, the cards comprising these can be combined into a single deck ready for NEC input via CARD EDITOR Option 6.1.
- Function Keys - Also referred to as FKs and <Fn> where n is a number from 1 to 10. These are the ten keys on the left side of the keyboard. The FKs have different meanings depending on the function being performed.
- Message Scroll Key - The Down Arrow <↓> can be used when in Create Geometry Cards (Option 1.2) and Create Program Control Cards (Option 1.3) to display all available prompt aids and messages for the current data item on line 24 of the screen.
- Script file - A special-purpose file used by CROSSTALK which can provide automatic log-on and file transfers (see Appendix A).
- wire - The lines connecting points in the MODEL MAKER files are called wires. All models are constructed of wires in this version of IGUANA.

wire card                    - A Geometry Card beginning with the two-character card code 'GW'. These are the only cards generated by the MODEL MAKER function, Generate Geometry Cards.

2.2 Applicable Documents. The following documents are required reading for the understanding and the operation of IGUANA. Additionally, all documentation provided with the purchase of the user's computer should be kept on hand for reference.

CROSSTALK-XVI Data Communications Software System; MICROSTUF, Inc., 1983

INTERACTIVE GRAPHICS UTILITY for ARMY NEC AUTOMATION (IGUANA) Computer Program Package Document; Naval Ocean Systems Center, San Diego, California 92152, 19 October 1984

MININEC: A Mini-Numerical Electromagnetics Code; \* NOSC TD 516, 6 September 1982

NUMERICAL ELECTROMAGNETICS CODE (NEC) - METHOD OF MOMENTS; NOSC TD 116, Volumes 1 and 2, January 1981

NOTE: The installation instructions provided with CROSSTALK can be ignored; installation of this package is performed during IGUANA installation.

\*This document will be superseded at a later date with an updated manual for MININEC.

## SECTION 3. SYSTEM REQUIREMENTS AND START-UP

3.1 General. Section 3 provides an overview of the equipment requirements and start-up procedures for IGUANA. Only the equipment required for the operation of the IGUANA functions is described in this document. NEC antenna evaluation is performed on a mainframe computer not considered a part of IGUANA.

### 3.2 Equipment Requirements

<u>Item</u>	<u>Part ID</u>
*Leading Edge PC-XT, 128K, 10MB Hard Disk, 360KB Diskette	MP-1676 L
*Leading Edge Color Monitor II	AT-1332AL
Leading Edge MS-DOS 2.11 and BASICA 2.11	LEPC DA
Intel 8087 Numeric Data Processor	
Inmac Switch	112
*Prometheus ProModem 1200	
Microstuff Crosstalk-XVI	
AST Megaplug Board with Printer Port, 512K Megapak	
Microsoft Mouse	
Science Accessories Corp Digitizer	GRAFBAR GP-7
*Hewlett-Packard ThinkJet Printer	HP 2225C
Hewlett-Packard Graphics Plotter	HP 7470A

\* or equivalent

Item

Part ID

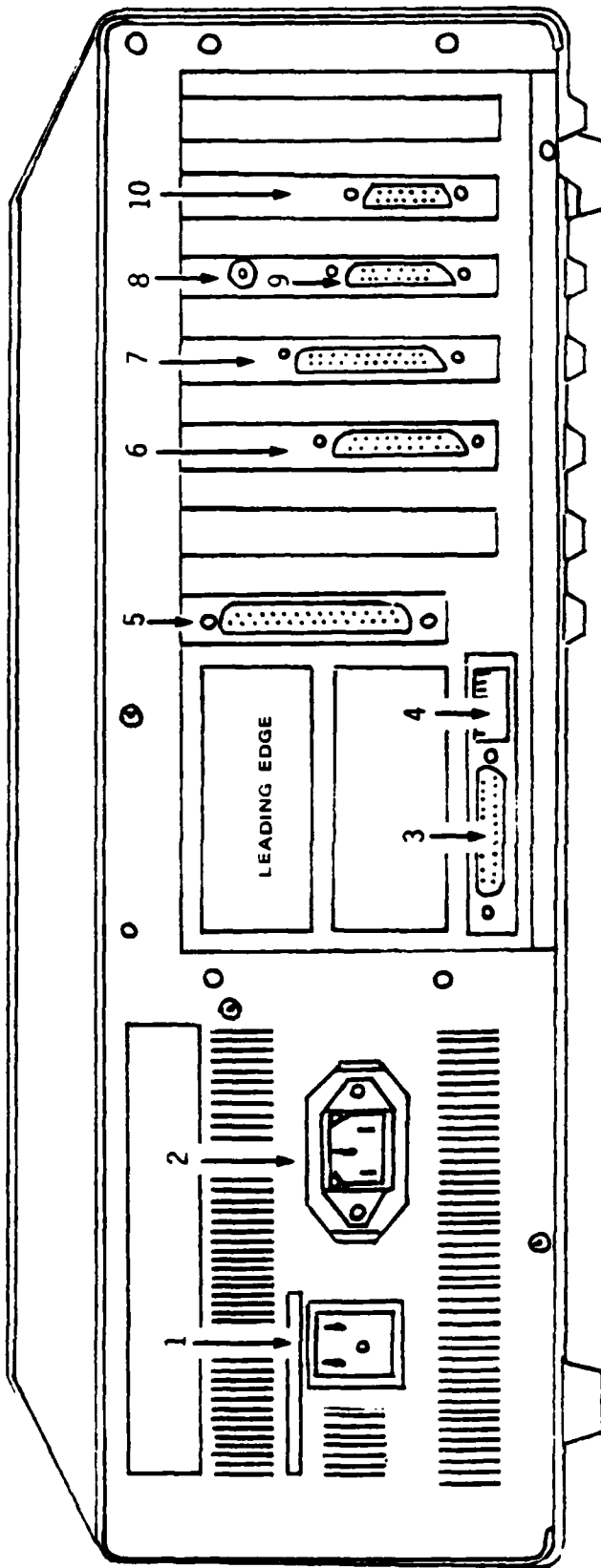
Miscellaneous Supplies:

Printer Ribbons, Cables, Paper,  
Plotter Pen Tips, etc.

Figure 3-1 shows the peripheral connections to the ports on the CPU chassis.

3.3 System Start-Up. Start-up procedures for IGUANA from an initial OFF condition are performed as follows:

- a. Switch the ON/OFF (toggle) switch on the computer to the ON position
- b. Switch the ON/OFF (toggle) switch on the plotter to the ON position.
- c. Switch the ON/OFF (toggle) switch on the printer to the ON position.
- d. Ensure that the printer ONLINE indicator light is ON.
- e. Switch the ON/OFF (toggle) switch on the digitizer to the ON position.
- f. The Master Menu is displayed, ready for user selection.
- g. Select Function 3 (SET DEFAULT VALUES) and enter the applicable values (see Section 5.3.3).



- 1 - Video Monitor Power
- 2 - PC-XT Power
- 3 - Printer Output Port (LPT1)
- 4 - Switch 3 (1-6 on, 7-8 off)
- 5 - Diskette Interface Connector (Not Used)
- 6 - Asynchronous Communications Port 2 (COM2) for Digitizer and Modem\*
- 7 - Asynchronous Communications Port 1 (COM1) for Plotter
- 8 - Composite Video Socket (Not Used)
- 9 - Nine-Pin Connector for Video Monitor
- 10 - Mouse Port

\*The PC XT supports only two asynchronous communications boards making it necessary to share COM2 between the Modem and the Digitizer. As these two devices are never required at the same time, this should cause no problems other than the inconvenience of flipping the Micro-T-Switch.

Figure 3-1. Power and Peripherals Connections

## SECTION 4. INFORMATION ENTRY AND FUNCTION KEY USE

4.1 General. This section provides users with the basics of data entry procedures and unique aspects of the system's functional capabilities. Included are explanations of data entry techniques and function key use.

4.2 Data Entry Information. There are, in IGUANA, three input devices:

- a. VDT keyboard - main input device
- b. Digitizer - for Top and Side View input and edit
- c. Mouse - for input editing and three-dimensional editing

Each of these input devices is used to enter data into the system. The user is informed (via the CRT and this manual) which input device is active at any given time.

4.2.1 VDT Keyboard Input. Operator input via the keyboard is requested in one of three ways:

- a. A menu of function, option, or sub-option choices is displayed on the screen and the user is prompted (by way of a message on the CRT) to press the function key corresponding to the task to be performed.
- b. A numbered list of available/acceptable input items is displayed (on one or more screen pages) and the user is instructed to enter the number corresponding to the item desired; for example, when selecting a data set (deck) name from a list of valid deck names.
- c. Data required in the creation of data sets, such as names for the subdecks, card codes, and items required to complete NEC input information, and other technical data are requested using a dialogue format. The required information is requested via a message (or messages) on the CRT which may include examples of acceptable input, valid range information, and/or maximum number of characters allowed in the entry. The user types the requested information following the guidelines provided in the prompt. If more instructions are needed, the HELP key <?> is available.

All operator entries are made by typing them at the VDT keyboard. To the system (except when using the editor) an upper case and lower case alpha character are both interpreted (and echoed) as upper case.

Generally, there are four input types accepted as valid responses to system prompts (not including function key use, described later):

- a. The requested information - This user input is validated for format and range (if applicable) and, if valid, is accepted and used in or used to direct subsequent processing.
- b. The HELP key <?> - The user can press the question mark key whenever an operator input prompt is displayed on the screen. A message is displayed clarifying the input requirement and/or specifying allowed value ranges.
- c. The ABORT key <Esc> - The Escape key is used to stop the current system process and to return to a previous menu level. Generally, none of the data input and/or calculated for the aborted function can be recovered.
- d. The Message Scroll key <↓> - During Geometry and Program Control Card entry, the Down Arrow key can be used to display all messages available for the given data item.

Input type (a.) above must always be ended by pressing the <Return> or <End> key. This completes the user entry and indicates to the system that the entry is ready for validation. In almost all cases, <Return> and <End> function identically; where they are different is noted in this user's guide. (<Return> may also be referred to as <CR>.)

In some cases, <Return>, alone, is accepted as valid input and can mean:

- a. Use the displayed value as the default input value.
- b. Done with sub-option or option - return to previous menu level.
- c. An edit function has been completed - continue processing (see Option 1, Sub-Option 1 and Option 2, Sub-Options 1 through 3 for examples).
- d. Display a list of file names (decks or models) for name entry or selection.

These uses of the <Return> key are explained in the user's input prompts and in the appropriate paragraphs in Section 5 of this manual - the user will always be informed when the <Return> key, alone, is a valid input, and what the use of it means to the system for the given situation.



4.2.2 Digitizer Input. The digitizer is employed by the MODEL MAKER function to enter the points which define the wires of a structure. All digitizer input is in digitizer units (0.01 centimeter). Before using the digitizer as the input device, a Setup procedure must be performed by the user. The following describes the Setup procedure (the user receives prompts to direct Setup for all but step a., below):

IMPORTANT: Before using the digitizer, the user must be sure the digitizer/modem switch is set in the digitizer position. Sometimes, after this switch is first set, the digitizer is not immediately initialized. The user is prompted to re-enter the point in such an event. Once that point has been processed by the digitizer, that device has been initialized and all other inputs are processed normally.

a. Prepare Drawing

1. Draw an X and Y axis such that the origin (0,0) of this coordinate system is at the lower left of the drawing and the drawing fits into the positive quadrant defined by the axes. The X axis must be parallel to the horizontal axis of the drawing. The bigger the axes, the better accuracy you will get.
2. If the drawing being used is too large for digitizer input, it will need to be broken up (by the user) into several smaller drawings, each of which will be entered as separate structures and assembled later. Mark the drawing for these separations if required.
3. Mark a scale line anywhere on the drawing (this can be a line of the drawing itself, if desired).
4. Mark a point on the drawing to be used as the reference point for aligning the Top and Side Views.
5. Tape or pin the drawing to the surface in front of the digitizer. The top of the drawing should be at least 2 inches from the front of the digitizer and the bottom should be no more than 2 feet away. The surface should be flat and sturdy. Objects such as books and coffee cups should not be in this area since they will cause the digitizer to take inaccurate readings.

- b. Set Input Type (always METRIC)
  - 1. Position digitizer pen in front of the digitizer bar CANCEL command and press down on pen.
  - 2. Position digitizer pen in front of the digitizer bar METRIC command and press down on pen.
- c. Establish Origin
  - 1. Position the digitizer pen in front of the digitizer bar ORIGIN command and press down on pen.
  - 2. Position the digitizer pen at coordinate system origin on drawing and press down on pen.
  - 3. Press the <Return> key to enter this as the coordinate system origin.
- d. Establish Screen View
  - 1. Position the digitizer pen on the right end of the X axis and press down on pen.
  - 2. Position the digitizer pen on the top end of the Y axis and press down on pen.
  - 3. Verify screen view. After you have entered the end points of the axes, the coordinates for these points are printed on the screen. For the X axis you should see a relatively large number followed by a relatively small number and for the Y axis you should see a small number followed by a large number. If this is not the case, your origin was not properly established and you need to back up (use <Back Space>) and start over at step c.
- e. Specify Scale (required for Top View only)
  - 1. Position the digitizer pen at the left end of the scale line on the drawing and press down on pen.
  - 2. Position the digitizer pen at the right end of the scale line on the drawing and press down on pen.
  - 3. Type (at keyboard) the length of this scale line (in meters) followed by <Return>.

NOTE: The ASSEMBLE MODELS option prefers to see all scales (for each separate piece) the same but will perform an automatic adjustment for scale when assembling two models together (may still not be a perfect fit).

f. Establish Register Point

1. Position the digitizer pen on the register point marked on the drawing and press down on pen.

IMPORTANT: The register point on the Top and Side View drawings MUST BE THE SAME POINT in the structure.

g. Specify planes of symmetry. The user is prompted to specify the Vertical axis of symmetry (reflection in the X-Y plane across a line parallel to the Y axis), the Horizontal axis of symmetry (reflection in the X-Y plane across a line parallel to the X axis), or No symmetry for the Top View input and Horizontal axis of symmetry or none for Side View input.

1. For the Vertical axis of symmetry, position the pen to a place on the drawing where the line of symmetry is to run parallel to the Y axis and press down on pen. If no Vertical axis of symmetry is desired, do not enter this line of symmetry - instead press the <Return> key.
2. For the Horizontal axis of symmetry, position the pen to a place on the drawing where the line of symmetry is to run parallel to the X axis and press down on pen. If no Horizontal axis of symmetry is desired, do not enter this line of symmetry - instead press the <Return> key.

NOTE: Symmetry can be used to reduce input/editing requirements when a structure view is identical across a given line of symmetry. No symmetry can be used for input of a pole (mast) and only the Horizontal axis of symmetry applies to input of a tower.

NOTES:

- (1) When beginning model entry, ALWAYS start with the Top View.
- (2) Before beginning digitizer input use SET DEFAULT VALUES (Function 3) to specify the digitizer resolution (tolerance). Refer to Section 5.3.3 for details on setting the digitizer tolerance.

After the Setup procedure has been successfully completed, the structure view can be input. The user is prompted to enter start points and end points for each wire in the view. When prompted for point entry, the user places the digitizer pen on a point in the drawing and presses down on the pen. Point entry is both audible and visible; that is, when a point is entered, the system "beeps" and the point is put in the corresponding location on the screen. The start point and end point have different tone beeps so that it is not necessary for the user to continually monitor the screen for input prompts. When both a start and end point have been entered, a line (wire) is automatically drawn between these two points. This describes the basics of view input via the digitizer. Additionally, when being prompted to enter the start and end points, the user can optionally:

- a. Press <L> in response to the Enter Start Point prompt. The system will use the last entered end point as the start point to "continue a line."
- b. Press <Back Space> key. If entering an end point, the system backs up to the previous start point and asks for another start point to replace it. If entering a start point when the <Back Space> key is pressed, the entire wire defined by the point entry (start and end) immediately preceding this is erased and the user can enter another end point.
- c. Press the <End> key when completely done entering the points (and wires) in the view.

See Section 5.3.2 for more details on Top and Side View input.

**4.2.3 Mouse Input.** The mouse is used to aid in the editing of the Top and Side Views, specifying section boundaries (for manual sectioning), editing section views, and editing a completed three-dimensional model.

When mouse input is expected, cross hairs are drawn on the screen. The mouse can be moved about on any flat surface (as long as its wheels are down). The cross hairs are moved about the screen accordingly. Once the cross hairs are positioned on a line or point (as required by the function being performed), press either of the two buttons on the front of the mouse to hook the point or line.

4.3 Function Key Use. In addition to the basic entry methods described in Section 4.2, the system also provides a variety of multi-use function keys (FKs). User prompts describe the use of these keys for a particular application. Function keys <F1> through <F10> are located on the left side of the keyboard and are used to:

- a. Access the options and sub-options from the displayed menus; the user is prompted to "Use Function Keys 1 thru n to SELECT OPTION."
- b. Aid in model input and editing (in conjunction with the digitizer and mouse).
- c. Specify edit functions to be performed when creating Comment Cards and editing a selected deck; at these times, function key meanings are displayed on line 25 of the screen. These uses are detailed in Section 5.3.1.2.

Other special purpose keys referred to as function keys are the cursor control keys, the <Back Space> key, <Ins> and <Del>, and the Tab key.

a. Cursor control keys:

1. Right Arrow <→> is used to move the cursor one character to the right when editing a card in a selected deck (CARD EDIT Options 2.1 - 2.3), to move the cursor one field to the right when creating/altering a Geometry or Program Control Card (in CARD EDIT Options 1.2 and 1.3), and to position a marker for section entry/edit in the MODEL MAKER function.
2. Left Arrow <←> is used to move the cursor one character to the left when editing a selected deck (CARD EDIT Options 2.1 through 2.3), to move the cursor one field to the left when creating/altering a Geometry or Program Control Card (in CARD EDIT Options 1.2 and 1.3), and to position a marker for section entry/edit in the MODEL MAKER function.
3. Up Arrow <↑> is used during CARD EDIT Options 1.1 and 2.1 through 2.3 to move the cursor up one line at a time (the cursor is not visible at this time - the entire line is brightened, instead) to the line which is to be edited, inserted after, or deleted. The <↑> is also used in the MODEL MAKER function to position a marker for section entry/edit.

4. Down Arrow <↓> is used during CARD EDIT Options 1.1 and 2.1 through 2.3 to move the cursor down one line at a time (again, the cursor is not visible) to the line which is to be acted upon and in the MODEL MAKER function to position a marker for section entry/edit. <↓> is also used to display additional input aids when creating Geometry and Program Control Cards in the prompted mode.
- b. <Back Space>, the key to the immediate left of <Num Lock>, is used during CARD EDIT Options 1.1 and 2.1 through 2.3 to back up one character and delete it. The <Back Space> is also used in the MODEL MAKER function to restart an input sequence.
- c. <Ins> and <Del> can be used during CARD EDIT Options 1.1 and 2.1 through 2.3 instead of the INSERT and DELETE character function keys. The <Del> key is also used to confirm certain wire and point deletion requests during model editing.

Function key use is further explained in the appropriate paragraphs of Section 5.

## SECTION 5. SYSTEM OPERATION

5.1 General. This portion of the User's Guide is written to describe, in detail, the operational capabilities of IGUANA, and to instruct the user in the use and operation of each of these capabilities. Detailed input prompt descriptions and input requirements are not provided here but are available through system prompts and HELP messages. This section describes each function, option, and sub-option in enough detail to allow a user new to IGUANA to quickly become acquainted with all system capabilities.

5.2 Presentation. Functions, options, and sub-options are described in their hierarchical order (see Section 1.3). The method used to reference a system capability within a specific function is:

x.y

where x = option

y = sub-option

For example, Option 1.2 from the CARD EDITOR refers to Option 1 (CREATE NEW NEC INPUT DECK), Sub-Option 2 (GEOMETRY CARDS).

Invalid input is rejected by the system and a "beep" and/or error message is presented on the screen. Therefore, throughout the following descriptions, user entries are assumed always to be correct - that is, input validation and error responses are not discussed other than in this paragraph.

All system functions are accessed from the Master Menu display (Figure 5-1).

### 5.3 Functional Description and Operating Procedures

5.3.1 CARD EDITOR Function. The CARD EDITOR provides the user with the means to create, edit, display, and delete NEC input decks - the data sets needed for NEC input. Figure 5-2 illustrates the concept of decks as used throughout this system.

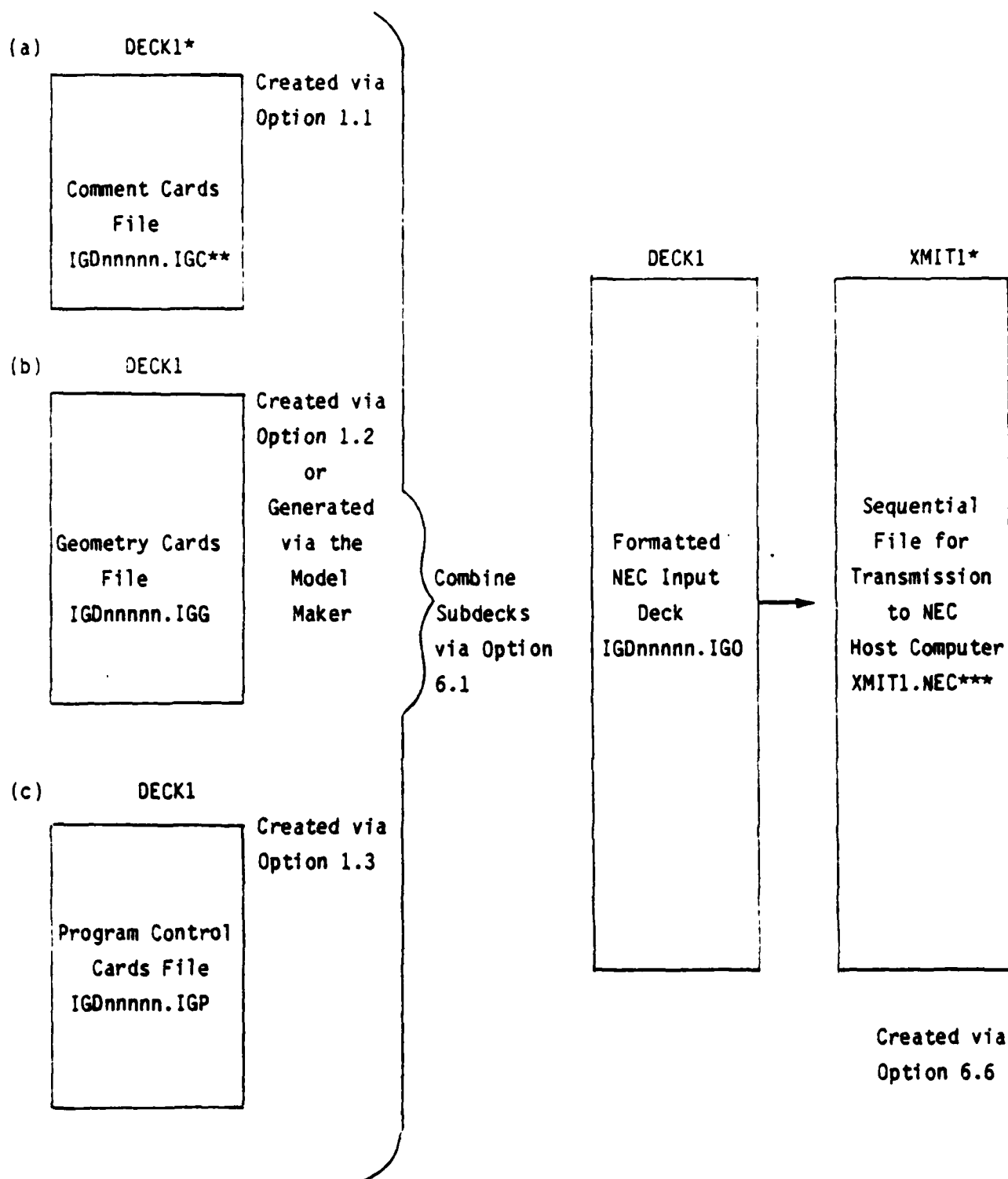
## INITIAL OPTIONS

- 1 - CARD EDITOR
- 2 - MODEL MAKER
- 3 - SET DEFAULT VALUES
- 4 - CROSSTALK - Transfer Files to/from another computer
- 5 - Plot Utilities
- 6 - Auxiliary Programs
- 7 - EXIT TO DOS

ENTER OPTION INDEX

Figure 5-1. Master Menu





- \* User-assigned name
- \*\* System-assigned filename
- \*\*\* NEC always added to user-assigned sequential filename

Figure 5-2. Subdecks and Filenames

First the user builds a Comment Card subdeck, a Geometry Card subdeck, and a Program Control Card subdeck (not necessarily in that order), assigning each of the subdecks the same name; e.g., DECK1. Each of these subdecks can be built via Option 1 - CREATE NEW NEC INPUT DECK.

NOTE: A Geometry subdeck can also be generated by the MODEL MAKER function - GENERATE WIRE CARDS.

Once a subdeck has been created it can be:

- a. Edited (Option 2)
- b. Copied and renamed to create an identical subdeck (Option 3)
- c. Displayed on the screen (Option 4)
- d. Deleted (Option 5)

If a subdeck has been created for each of the card types (and all have been given the same name), Option 6 can be used to combine them into a single deck, formatted with or without a comma separating the card code from the data fields, and translated into a sequential file format ready for input to the NEC program.

Option 6 also allows the user to:

- a. Display and print any formatted deck
- b. Delete a formatted deck
- c. Append one or more formatted decks to another
- d. Edit a formatted deck
- e. Prepare and store a formatted deck as a sequential file for NEC input
- f. Delete any prepared transmit decks (sequential files)
- g. Translate any sequential file (i.e., a NEC input data set created on another computer) into a format which can be read and edited via the CARD EDITOR.

Option 7 provides a means to display or print the names and record counts of each existing subdeck.

## Notes on Naming Subdecks

When Option 1 is used to create a subdeck for the specified card type, the user is prompted for entry of a name for this subdeck. This can be any name up to 10 characters in length which should be meaningful to the user (this makes future retrieval easier). It is important to know that the user-assigned name is not the filename. The filename is generated by the system in the following manner:

IGDnnnnn.IGa,

where

nnnnn is a five-digit number from 00001 through 99999 (the same for each subdeck having the same user-assigned name and for a deck formatted for NEC input from these same named subdecks) and

where

"a" is a one-character code indicating the subdeck or deck type.

<u>a</u>	<u>Type</u>
C	Comment Cards
G	Geometry Cards
P	Program Control Cards
O	NEC input deck (formatted)

Thus, the filenames for subdecks having the name DECK1 might be:

IGD12345.IGC  
IGD12345.IGG  
IGD12345.IGP

If a formatted deck has been created from these subdecks its name would be:

IDG12345.IGO

### 5.3.1.1 Option 1 - CREATE NEW NEC INPUT DECK

#### Function

Option 1 is used to create Comment Card, Geometry Card, and Program Control Card subdecks. The user is prompted to specify the subdeck card type to be created and then is asked to provide a name for the new subdeck. If a subdeck already exists with the name specified, the user is notified and is asked whether the old subdeck with this name is to be overwritten. A positive response will result in all subdecks (and the formatted deck, if any) with this name being deleted. THERE IS NO RECOVERY - SO BE CAREFUL! If the user responds negatively, he is prompted for another name entry.

For Program Control and Geometry subdeck creation, there are two modes of data entry: prompted and nonprompted. The nonprompted mode works just like Option 2 (EDIT EXISTING DECK) and is discussed under Option 2. This mode is recommended only for experienced users who know the meanings of the data fields in NEC card images.

The prompted mode displays the valid card codes and their meanings, and prompts the user for input to every data field in a card. Most users will find this to be the easiest way to create Geometry and Program Control Cards until they become very familiar with the NEC input requirements.

#### Access

Press <F1> from the Option Menu (Figure 5-3). The Sub-Option Menu is displayed:

#### SUB-OPTION MENU FOR DECK CREATE

- 1 - COMMENT CARDS
- 2 - GEOMETRY CARDS
- 3 - PROGRAM CONTROL CARDS

. . . Use Function Keys 1 thru 3 to SELECT OPTION . . .

Press the function key corresponding to the card type you wish to create.

### CARD EDITOR FUNCTIONS

- 1 - CREATE NEW NEC INPUT DECK
- 2 - EDIT EXISTING DECK
- 3 - COPY and RENAME EXISTING DECK
- 4 - DISPLAY EXISTING DECK
- 5 - DELETE EXISTING DECK
- 6 - NEC INPUT DECK MAINTENANCE
- 7 - DISPLAY DECK FILE STATUS
- 8 - DISPLAY/UPDATE NEC HOST TABLE
- 9 - ARCHIVE/RESTORE DECK(S)

. . . Use Function Keys 1 thru 9 to SELECT OPTION . . .

Figure 5-3. CARD EDITOR Option Menu

Once the card type has been specified, a list of the existing deck names is displayed and the user is prompted for entry of a name for the subdeck about to be created:

ENTER NAME FOR NEW (card type) CARDS:

ENTER UP TO 10 CHARACTERS FOR NEW DATA SET NAME (<Return> = NEXT PAGE)

Enter a name and press <Return>. If a subdeck already exists with this name, the user receives this notice:

Name: (user-specified name) Already used - Do you want to OVERWRITE it?  
ENTER 'Y' TO OVERWRITE CURRENT DATA SET FOR SAME NAME

A 'Y' response causes any subdecks with the specified name to be deleted. An 'N' response results in the user being reprompted for name entry.

Next, the user is prompted to select the input mode desired (for Geometry and Program Control Card input):

DO YOU WANT FIELD-BY-FIELD PROMPTING DURING CARD INPUT?  
ENTER 'Y' TO RECEIVE PROMPTS FOR DATA ENTRY

A 'Y' response loads the input prompt program to provide prompts for the user for each data field. An 'N' response loads the deck edit program, allowing the user to type cards in the line edit mode (see Option 2 for details). Comment Cards are always input in the nonprompted mode.

5.3.1.1.1 Creating Comment Cards. The Comment Card create program works just like the line editor (CARD EDITOR Option 2) with the following exceptions:

- a. A 'CE' (Comment End) card is automatically inserted as the first card in the new Comment Card subdeck (see Figure 5-4). The user may elect to insert cards in front of the 'CE' card and/or edit the 'CE' card to add comments after the two-character card code. The 'CE' card must remain the last card in the Comment Card subdeck.

Use ↓ or ↑ to find line - F1 thru F8 to select function

CE

1 SAVE 2 EDIT 3 INSERT 4 DELETE 5 PRINT 6 1ST PG 7 NXT PG 8 GOTO # 9 0

---

When the create program for Comment Cards is first invoked, a 'CE' card is automatically inserted as the first card image. Use Function Key 2 (<F2> - EDIT) to add a comment after the 'CE' characters; or use Function Key 3 (<F3> - INSERT) to insert a 'CM' card before the 'CE' card image.

The first time INSERT is pressed, a 'CM' card is inserted immediately before the 'CE' card. All following INSERTs will insert a 'CM' card immediately following the line that is highlighted on the screen display.

Function Key 4 DELETES the highlighted card image. Function Key 5 PRINTs a copy of the sub-deck on the hard-copy printer. Function Key 7 is used to display the NeXT screen PaGe of 20 card images; if there is no NXT PG, the first page is redisplayed. To restart display from the beginning, use Function Key 6, 1ST PG. Function Key 8, GOTO #, allows the user to specify a line number. The card image on that line is highlighted and displayed towards the center of the screen page.

When all card images for this sub-deck have been created, press Function Key 1 to SAVE the completed sub-deck on disk.

Figure 5-4. Create Comment Cards: First-Level Edit Function Key Display

- b. When the user elects to insert a card (or cards) in front of the Comment End card, the new card is automatically started with 'CM' as the first two characters. User input begins at character 3.
- c. The edit cursor cannot be positioned on the first two characters of a card image. Therefore, these two characters cannot be altered.

5.3.1.1.2 Creating Geometry Cards (Prompted Mode). Figure 5-5 shows the screen display during Geometry Card input in the prompted mode. All valid Geometry Card codes are displayed on the top half of the screen. The bottom two lines are used for input prompting and user-input display. The last four card images input are displayed between the card code list and the user-input display line.

When entering data in the prompted mode, enter the desired card code first. The input cursor is automatically positioned at the next field requiring data entry and the user is prompted appropriately.

**Data Entry** - Type the value to be placed in the current field and press <Return>. If the entered value is valid, it is repositioned in the field and the input cursor is advanced to the next field.

**Invalid Input** - If the entered value is invalid, an error message is displayed and the user is prompted to re-enter a value for this field.

**Input Aids** - Besides the input prompts, there may be other input aid messages available for a given field. Press the Down Arrow <↓> to display other messages. These may include default values, value ranges, and current value displays. After an invalid input message is displayed, the original prompt can be redisplayed by pressing the <↓>.

**Default Values** - Input for some fields is optional. A default value is supplied (and can be viewed via the <↓> key) and will be used as the field value if the user presses the <Return> key without entering a value.



# GEOMETRY CARD CODES

GA - WIRE ARC	GX - REFLECT STRUCTURE
GF - USE NUMERICAL GREEN'S FUNCTION	SP - SPECIFY SURFACE PATCH
GM - SHIFT & DUPLICATE STRUCTURE	SC - CONTINUE SP or SM CARD
GR - GENERATE CYLINDRICAL STRUCTURE	SM - GENERATE MULTIPLE SURFACE PATCHES
GW - SPECIFY WIRE	GS - SCALE STRUCTURE DIMENSIONS
GC - SPECIFY WIRE TAPERING	GE - END GEOMETRY SPECIFICATION

Use GE to end Geometry Card entry

```
GW 1 10 -350. 0. 150. 0. 150. 150. .1
GX 1 100
GX 2 100
GS 0.30480
```

GE  
ENTER CARD CODE FROM LIST ABOVE OR <PgUp>

---

Top half of screen - valid Card Codes and descriptions  
Last line - user input prompt  
Next to last line - user input display  
Screen lines 18-21 - last four Geometry Cards entered

Figure 5-5. Create Geometry Cards (Prompted Mode)

- Empty Fields - Not all fields are used for every card image. The create program automatically sets these fields to zero and does not ask for user input.
- Floating Point Input - If an integer is entered in a floating point field, the system automatically terminates the value with a decimal point.
- Cursor Movement - When the user has entered a valid value into a field, the cursor is automatically advanced to the next (required) field for data entry. When all fields have been entered, the cursor returns to the first field (after the card code). The user can then press the <←> or <→> keys to position the input cursor on a field that requires changing. The appropriate prompt for that field is displayed and the user can either enter a new value for that field or press <←> to keep the current value and move on to the next field.
- Card Done - When the entire card has been completed to the user's satisfaction, press the <End> key to save that card in the Geometry subdeck.
- Input Review - The last four cards entered are always displayed just above the user entry display line. To view all input to this point, use the Page Up key <Pg Up>. While in view mode, the <Pg Up> and <Pg Dn> keys can be used to scroll up and down. Press <Return> to return to data entry mode.
- <Esc> Key - To abort the current card entry, press <Esc> until the prompt for card code entry is redisplayed. If <Esc> is pressed in response to the card code entry prompt before the first card has been completed, no Geometry subdeck is created and the CARD EDITOR Option Menu is redisplayed.
- Subdeck Complete - To end Geometry Card input use the 'GE' card code. The 'GE' card is added as the last card in the Geometry subdeck and the Option Menu is redisplayed.

5.3.1.1.3 Creating Program Control Cards (Prompted Mode). Figure 5-6 shows the screen display during Program Control Card input in the prompted mode. All valid Program Control Card codes are displayed at the top half of the screen. The bottom two lines are used for input prompting and user-input display. The last four card images input are displayed between the card code list and the user-input display line.

When entering data in the prompted mode, enter the desired card code first. The input cursor is automatically positioned at the next field requiring data entry and the user is prompted appropriately.

**Data Entry** - Type the value to be placed in the current field and press <Return>. If the entered value is valid it is repositioned in the field and the input cursor is advanced to the next field.

**Invalid Input** - If the entered value is invalid, an error message is displayed and the user is prompted to re-enter a value for this field.

**Input Aids** - Besides the input prompts, there may be other input aid messages available for a given field. Press the Down Arrow <↓> to display other messages. These may include default values, value ranges, and current value displays. After an invalid input message is displayed, the original prompt can be redisplayed by pressing the <↓>.

**Default Values** - Input for some fields is optional. A default value is supplied (and can be viewed via the <↓> key) and will be used as the field value if the user presses the <Return> key without entering a value.

**Empty Fields** - Not all fields are used for every card image. The Create Program automatically sets these fields to zero and does not ask for user input.

**Floating Point Input** - If an integer is entered in a floating point field, the system automatically terminates the value with a decimal point.

PROGRAM CONTROL CARD CODES:

CP - COUPLING CALCULATION	NT - TWO-PORT NETWORK
EK - EXTENDED THIN-WIRE KERNEL FLAG	PQ - WIRE CHARGE DENSITY PRINT CONTROL
EX - STRUCTURE EXCITATION	PT - WIRE-CURRENT PRINT CONTROL
FR - FREQUENCY	RP - RADIATION PATTERN REQUEST
GN - GROUND PARAMETERS	TL - TRANSMISSION LINE
GD - ADDITIONAL GROUND PARAMETERS	PL - DATA STORAGE FOR PLOTTING
KH - INTERACTION APPROXIMATION RANGE	WG - WRITE NGF FILE
LD - STRUCTURE IMPEDANCE LOADING	XQ - EXECUTE
NE - NEAR ELECTRIC FIELD REQUEST	NX - NEXT STRUCTURE FLAG
NH - NEAR MAGNETIC FIELD REQUEST	EN - END OF DATA

Type EN to end Program Control Card entry

```

FR      1      30.
EX 0      0      5      0      1.
GN 1
RP 0      10      2 1301      0.      0.      10.      90.

GN 0      0      0      6.      1.0E-3
ENTER GROUND TYPE PARAMETER (-1,0,1, or 2)

```

---

Top half of screen - valid Card Codes and descriptions  
 Last line - user input prompt  
 Next to last line - user input display  
 Screen lines 18-21 - last four Program Control Cards input

Figure 5-6. Create Program Control Cards (Prompted Mode)

- Cursor Movement - When the user has entered a valid value into a field, the cursor is automatically advanced to the next (required) field for data entry. When all fields have been entered, the cursor returns to the first field (after the card code). The user can then press the <←> or <→> keys to position the input cursor on a field that requires changing. The appropriate prompt for that field is displayed and the user can either enter a new value for that field or press <→> to keep the current value and move on to the next field.
- Card Done - When the entire card has been completed to the user's satisfaction, press the <End> key to save that card in the Program Control subdeck.
- Input Review - The last four cards entered are always displayed just above the user entry display line. To view the input to this point, use the <Pg Up> key. While in view mode, <Pg Up> and <Pg Dn> can be used to scroll. Press <Return> to return to data entry mode.
- <Esc> Key - To abort the current card entry, press <Esc> until the prompt for card code entry is redisplayed. If <Esc> is pressed in response to the card code entry prompt before the first card has been completed, no Program Control subdeck is created and the CARD EDITOR Option Menu is redisplayed.
- Subdeck Complete - To end Geometry Card input use the 'EN' card code. The 'EN' card is added as the last card in the Program Control subdeck and the Option Menu is redisplayed.

5.3.1.1.4 Creating Geometry/Program Control Cards (Nonprompted Mode). When the user elects to create Geometry or Program Control subdecks in the non-prompted mode, the system line editor is called up and the user starts with a blank screen (except for prompts). Refer to Section 5.3.1.2 for the line editor functions and operating instructions.

It is the user's responsibility to ensure, for each card image input, that:

- a. The first two characters represent a valid card code
- b. The data fields are set to valid values
- c. Unused data fields are set to "0" for integer fields and "0." for real fields

These checks are performed automatically when subdecks are created using the prompted mode of data entry.

#### 5.3.1.2 Option 2 - EDIT EXISTING DECK

##### Function

Option 2 is used to edit Comment, Geometry, and Program Control subdecks which have already been created via Option 1. (Geometry subdecks can also be created by way of the MODEL MAKER's Generate Wire Cards function.)

The user is prompted to specify the subdeck type to be edited and then the specific subdeck to be retrieved for editing. The specified deck is retrieved and is displayed one screen page at a time. Each card image is displayed on one screen line (maximum is 100 characters per card image).

This is a line editor; that is, the user must select the line to be edited (or deleted or inserted) and only that line can be edited until the user indicates DONE with that line. The edit functions are identical, regardless of subdeck type except for subdeck maximums:

Comment Cards	- Maximum = 20 card images
Geometry Cards	- Maximum = 1000 card images
Program Control Cards	- Maximum = 1000 card images

##### Access

Press <F2> from the Option Menu (Figure 5-3).

The Sub-Option Menu is displayed:

SUB-OPTION MENU FOR DECK EDIT

- 1 - COMMENT CARDS
- 2 - GEOMETRY CARDS
- 3 - PROGRAM CONTROL CARDS

. . . Use Function Keys 1 thru 3 to SELECT OPTION . . .

Press the function key corresponding to the card type to edit.

Once the card type has been specified, the user is prompted to specify the sub-deck to be edited:

ENTER THE NAME OF (card type) TO EDIT OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

The user has two methods of specifying the subdeck to be edited:

- a. Enter the name of the subdeck to be edited - this is the name given to the subdeck by the user when it was created.
- b. Press the <Return> key to view a list of all subdecks of the specified card type. To select one of these subdecks, type the number corresponding to the subdeck to be edited, followed by <Return>.

After the subdeck has been selected, it is retrieved and the first screen page of card images is displayed. At the top of the screen is the first level edit prompt:

Use ↓ or ↑ to find line - F1 thru F8 to select function

The current (cursor-position) line is highlighted. To select any line for editing, deleting, or inserting AFTER, use the Up and Down Arrow keys (<↑> and <↓>). The first-level edit function keys are displayed on screen line 25 (see Figure 5-7).

Use ↓ or ↑ to find line - F1 thru F8 to select function

Data Set: DECK1 (COMMENT CARDS)  
CMEXAMPLE 2. CENTER FED LINEAR ANTENNA  
CM CURRENT SLOPE DISCONTINUITY SOURCE.  
CM 1. THIN PERFECTLY CONDUCTING WIRE  
CE 2. THIN ALUMINUMM WIRE

1 SAVE 2 EDIT 3 INSERT 4 DELETE 5 PRINT 6 1ST PG 7 NXT PG 8 GOTO # 9 0

---

Notice that the last card image includes a misspelled word. Use the Down Arrow <↓> to position the cursor (actually to highlight this card image) for editing. When a card image is highlighted, it is the current (working) line. After the appropriate card image has been selected, press Function Key 2 (<F2> - EDIT) from the first-level Function Key display. The second-level Function Keys are then displayed and the selected card image can be edited (see Figure 5-8).

Card images can also be inserted AFTER a selected (highlighted) line by pressing <F3>, INSERT. A blank line is then inserted immediately following the highlighted card image and the second-level Function Keys are displayed. Type the new card image and press <F1>, DONE, from the second-level Function Keys.

When satisfied that the sub-deck is complete, press Function Key 1 from the first-level Function Key display to SAVE the updated sub-deck on disk.

Figure 5-7. Edit Existing Deck: First-Level Edit Function Key Display



It is the user's responsibility to ensure that when card images are inserted and edited that:

- a. The first two characters represent a valid card code
- b. The data fields are set to valid values
- c. Unused data fields are set to "0" for integer fields and "0." for real fields

These checks are performed automatically when the prompted mode of card input (Options 1.2 and 1.3) is used.

Once the line has been selected, the following editing functions may be performed:

- a. EDIT <F2> - edit the highlighted line; enables the following line-edit function keys (second-level edit FKs - see Figure 5-8):
  1. DONE <F1> - saves edited line and returns system to first-level function keys
  2. INSERT <F2> - toggles insert mode (represented by small flashing cursor) ON/OFF to allow character insertion. Insertion will be made one character BEFORE the character at the cursor position.
  3. DELETE <F3> - deletes character at cursor position and moves the rest of the line left to close the character gap
  4. ERASE <F4> - erases from cursor through end of line

Also enabled are:

1. <→> - moves cursor right one character
2. <←> - moves cursor left one character
- 3.. <Ins> - same as INSERT FK (<F2>)
4. <Del> - same as DELETE FK (<F3>)
5. <Esc> - returns system to first-level FKs - NO CHANGES to line
6. <End> - same as DONE FK (<F1>)
7. <Return> - same as DONE FK (<F1>)
8. <Back Space> - moves cursor left and deletes character

Use ← or → to position cursor - F1 thru F4 or <backspace> for function

Data Set: DECK1 (COMMENT CARDS)  
CMEXAMPLE 2. CENTER FED LINEAR ANTENNA  
CM CURRENT SLOPE DISCONTINUITY SOURCE.  
CM 1. THIN PERFECTLY CONDUCTING WIRE  
CE 2. THIN ALUMINUM WIRE

1 DONE 2 INSERT 3 DELETE 4 ERASE 5 6 7 8 9 0

---

Function Key 2, EDIT, has been pressed from the first-level Function Key display (see Figure 5-7) to edit the last card image in this sub-deck. The Right Arrow key <→> is then used to position the cursor over the last 'M' in the word 'ALUMINUMM'. When the cursor is correctly positioned, use Function Key 3, DELETE, or the <Del> key to erase this character and move the remainder of the line left by one to close up the space left by the DELETE function.

When all changes have been made to the card image, press <F1>, DONE, to return to the first-level Function Key display.

Figure 5-8. Edit Existing Deck: Second-Level Edit Function Key Display

- b. INSERT <F3> - inserts a new line AFTER the highlighted line, then automatically goes into EDIT mode for the new line. Everything is the same as described for EDIT except <Return>. If <Return> is pressed when in INSERT (line) mode, the new line is saved and another line is inserted after the one just built. To exit INSERT mode, use <End> or <F1>.
- c. DELETE <F4> - deletes the highlighted line
- d. SAVE <F1> - writes edited deck to disk and returns to Option Menu
- e. PRINT <F5> - outputs the deck being edited to the printer
- f. 1ST PG <F6> - displays first page of deck cards (20 cards)
- g. NEXT PG <F7> - displays next 20 cards of deck
- h. GOTO # <F8> - prompts the user to specify the line number to go to and displays that card towards the middle of the screen page

If the user aborts out (by pressing the <Esc> key) instead of saving the deck via the SAVE function key, none of the edits is saved.

#### 5.3.1.3 Option 3 - COPY and RENAME EXISTING DECK

##### Function

Option 3 is used to duplicate an existing Comment, Geometry, or Program Control subdeck created via Option 1 or, in the case of Geometry subdecks, by way of the MODEL MAKER's Generate Wire Cards function. The copy and rename function is particularly useful if you wish to create an almost identical subdeck. Call Option 3 to copy and rename the subdeck you wish to duplicate; then use Option 2 (EDIT EXISTING DECK) to alter the duplicated deck as needed.

Option 3 prompts the user to select the subdeck type to be duplicated and then requests the user to specify the actual subdeck to be copied. The user is asked to supply a new name for the copied version (same naming rules apply as discussed in Section 5.3.1). The copied version cannot be given the same name as the original version of the subdeck.

## Access

Press <F3> from the Option Menu (Figure 5-3).  
The Sub-Option Menu is displayed.

### SUB-OPTION MENU FOR DECK COPY/RENAME

- 1 - COMMENT CARDS
- 2 - GEOMETRY CARDS
- 3 - PROGRAM CONTROL CARDS

. . . Use Function Keys 1 thru 3 to SELECT OPTION . . .

Press the function key corresponding to the subdeck type to be duplicated.

Once the card type has been specified, the user is prompted to specify the sub-deck to be duplicated:

ENTER NAME OF (card type) TO COPY/RENAME OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

The user has two methods of selecting the subdeck to be duplicated:

- a. Enter the name of the subdeck to be duplicated - this is the name given to the subdeck by the user when it was created.
- b. Press the <Return> key to view a list of all subdecks of the specified card type. To select one of these subdecks, type the number corresponding to the subdeck to be duplicated, followed by <Return>.

After the subdeck has been selected, a list of the existing names is displayed and the user is prompted to enter a new name for the copied deck:

ENTER NAME FOR NEW (card type):  
ENTER UP TO 10 CHARACTERS FOR NEW DATA SET NAME (<Return> = NEXT PAGE)

Enter a name, following the guidelines presented in paragraph 5.3.1. Remember to be careful when using a name that has already been assigned to a subdeck.

#### 5.3.1.4 Option 4 - DISPLAY EXISTING DECK

##### Function

Option 4 is used to display selected subdecks on the screen or to print them on the hardcopy printer.

The user is prompted to select the subdeck type to be retrieved: Comment, Geometry, Program Control, or all of the above. The user is then asked to specify the name of the subdeck to be retrieved. If the user has specified 'ALL of the above' as the subdeck type, all subdecks having the specified name will be retrieved. Next, the user is prompted to select the screen or the printer as the output device. The specified subdeck(s) is retrieved and displayed or printed.

##### Access

Press <F4> from the Option Menu (Figure 5-3).

The Sub-Option Menu is displayed:

##### SUB-OPTION MENU FOR DECK PRINT

- 1 - COMMENT CARDS
- 2 - GEOMETRY CARDS
- 3 - PROGRAM CONTROL CARDS
- 4 - ALL of the above

. . . Use Function Keys 1 thru 4 to SELECT OPTION . . .

Press the function key corresponding to the subdeck type to display or print.

Once the card type has been specified, the user is prompted to select the subdeck to be displayed or printed:

ENTER NAME OF (card type) TO PRINT OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

The user has two methods of selecting the subdeck to be displayed or printed:

- a. Enter the name of the subdeck to be retrieved - this is the name given to the subdeck by the user when it was created.
- b. Press the <Return> key to view a list of all candidate subdecks. To select one of these subdecks, type the number corresponding to the subdeck to be retrieved, followed by <Return>.

After the subdeck name has been specified, the user is requested to select the output device:

- 1 - SCREEN OUTPUT
- 2 - PRINTER OUTPUT

. . . Use Function Keys 1 thru 2 to SELECT OPTION . . .

Press the function key corresponding to the output device desired.

If screen output is selected, the card images of the selected deck are displayed on the screen. The bottom line prompt reads:

. . . . . PRESS ANY KEY TO STOP/START SCROLL . . . . .

Any key can be used to toggle the screen scrolling OFF or ON. That is, if lines are being written on the screen, pressing any key will stop the screen writes. By pressing any key again, the screen writes are continued. After the last card of a subdeck has been written on the screen, the bottom line reads:

. . . . . PRESS ANY KEY TO EXIT . . . . .

If the user has requested that all subdecks having the specified name be displayed, the previous prompt is displayed when the end of each subdeck has been reached. By pressing any key, the user initiates the retrieval and display of the next subdeck having the specified name. When the last card in the last subdeck has been displayed, the input of any key redispays the Option Menu.

When the printer is chosen as the output device, the user is prompted to specify single- or double-spaced output:

DOUBLE OR SINGLE SPACED OUTPUT?

ENTER '2' FOR DOUBLE SPACE (Default = Single Space)

All card images from the selected subdeck(s) are printed single- or double-spaced as specified. There is no further user action required.

#### 5.3.1.5 Option 5 - DELETE EXISTING DECK

##### Function

Option 5 is used to delete Comment, Geometry, and Program Control subdecks from the disk when they are no longer needed. This is done purely to free up disk space and keep subdeck lists down to a manageable number for scanning.

The user is prompted to select the subdeck type to be deleted. This can be any one of the three types or 'ALL' types existing with the user-specified name. The user is then asked to specify the name of the subdeck(s) to be deleted. The subdeck(s) of the specified type and name are retrieved and one screen page is displayed for each. The user is prompted to confirm the deletion request after examining the displayed page to make sure it is from the subdeck to be deleted.

##### Access

Press <F5> from the Option Menu (Figure 5-3).

The Sub-Option Menu is displayed:

#### SUB-OPTION MENU FOR DECK DELETE

- 1 - COMMENT CARDS
- 2 - GEOMETRY CARDS
- 3 - PROGRAM CONTROL CARDS
- 4 - ALL of the above

. . . Use Function Keys 1 thru 4 to SELECT OPTION . . .

Press the function key corresponding to the subdeck type to be deleted.

Once the card type has been specified, the user is prompted to select the subdeck to be deleted:

ENTER NAME OF (card type) TO DELETE OR <CR> TO SEE LIST

This is the name of the deck you want to work with

The user has two methods of selecting the subdeck to be deleted:

- a. Enter the name of the subdeck to be deleted - this is the name given to the subdeck by the user when it was created.
- b. Press the <Return> key to view a list of all candidate subdecks. To select one of these subdecks, type the number corresponding to the subdeck to be deleted, followed by <Return>.

The specified subdeck is retrieved and the first screen page of card images is displayed on the screen. Examine the display carefully, then respond to the prompt at the bottom of the screen:

ARE THESE THE (card type) YOU WANT TO DELETE?

TYPE 'DEL' TO CONFIRM DELETION ACTION - ANY OTHER KEY TO EXIT

If these cards are from the subdeck you want deleted, type 'DEL' <Return> to delete this subdeck from the disk.

CAUTION: Be sure this is the subdeck you want erased before confirming the deletion request - THERE IS NO MEANS OF RECOVERY once the deletion has been performed.

If 'ALL of the above' was chosen instead of a specific card type, the display and confirmation process is repeated for each existing subdeck having the specified name.



### 5.3.1.6 Option 6 - NEC INPUT DECK MAINTENANCE

#### Function

Figure 5-2 illustrates the relationship of the subdecks created and maintained via Options 1 through 5 to a formatted NEC input deck. Option 6 is used to combine the three subdecks having the same user-assigned name, into a single deck ready for translation to a sequential file and subsequent input to the NEC program. Option 6 is also used to display and/or print a NEC input deck, to delete NEC input decks which have become obsolete, to append one or more formatted input decks to another, to edit a formatted deck, to prepare or delete a deck (as a sequential file) for input to the NEC program, or to translate a sequential file into a format which can be read and edited via the CARD EDITOR (a formatted data set).

#### Access

Press <F6> from the Option Menu (Figure 5-3).

The Sub-Option Menu is displayed:

#### NEC INPUT DECK MAINTENANCE

- 1 - FORMAT DECK FOR NEC INPUT
- 2 - DISPLAY FORMATTED DECK
- 3 - DELETE FORMATTED DECK
- 4 - APPEND TO FORMATTED DECK
- 5 - EDIT FORMATTED DECK
- 6 - PREPARE DECK FOR TRANSMISSION
- 7 - DELETE TRANSMIT DECK (Sequential File)
- 8 - TRANSLATE FILE FROM OTHER SOURCE (Sequential File to Formatted Deck)

. . . Use Function Keys 1 thru 8 to SELECT OPTION . . .

Press the function key corresponding to the sub-option choice desired.

5.3.1.6.1 Formatting a Deck for Input to NEC. When Sub-Option 1 is selected, the user must specify the name of the subdecks to be combined into a NEC input deck:

ENTER NAME OF DECK TO FORMAT OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

The user has two methods of specifying the name:

- a. Enter the user-assigned name of the deck to be formatted, followed by <Return>.
- b. Press <Return> to display the list of candidate subdecks for formatting. Type the number corresponding to the name you wish, followed by <Return>.

NOTE: In order for a NEC input deck to be formatted, a subdeck must have already been created for all three card types (Comment, Geometry, and Program Control Cards).

Next, the user is required to specify the format type desired:

FORMAT WITH COMMA AFTER CARD CODE?

ENTER 'Y' TO SEPARATE CARD CODE FROM DATA FIELDS WITH A COMMA

If the response to the above prompt is Yes (Y), each card image in the NEC input deck will be formatted with a comma between fields 1 and 2 (for example, PL,3,1,0,4,).

Any other response results in the card images being written with no delimiter between the first and second fields (PL3,1,0,4,).

Commas are inserted and extraneous blanks removed between all other fields in the card image. A comma is added as the last character of the card image.

If the selected deck was previously formatted, a warning is displayed on the screen:

(deckname) already formatted - Do you want to OVERWRITE it?

ENTER 'Y' TO OVERWRITE FORMATTED NEC INPUT DECK

CAUTION: If you choose to overwrite the formatted deck with this new one, the original formatted data set is lost - there is no recovery capability.

Once the selected deck has been formatted (all three card types combined) the user is asked if another deck is to be appended for NEC input:

DO YOU WANT TO APPEND A DECK FOR ANOTHER STRUCTURE?  
ENTER 'Y' TO APPEND A DECK

If another structure is to be computed in the planned NEC run, this function allows the user to combine the cards for that structure with the cards for the first structure selected. If an 'EN' card was included in the first deck, that card is replaced with an 'NX' card (next structure). After responding 'Y' to the above prompt, the user is asked to select the deck to be appended. Any deck may be selected.

Any number of decks may be appended in this manner. 'NX' cards will be placed in appropriate locations and the last card will always be 'EN'.

5.3.1.6.2 Displaying/Printing a NEC Input Deck. Once a deck has been formatted for input to NEC (see Section 5.3.1.6.1), it can be displayed on the screen or output to the printer via Sub-Option 2 of the NEC INPUT DECK MAINTENANCE function (Option 6).

The user is prompted to specify the deck name to be displayed or printed:

ENTER NAME OF DECK TO PRINT OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

The user has two methods of specifying the deck name:

- a. Enter the name assigned to this deck by the user when it was created.
- b. Press <Return> to display the list of all formatted decks. Type the number corresponding to the deck to be retrieved, followed by <Return>.

After the deck has been specified, the user is prompted for selection of the output device:

- 1 - SCREEN OUTPUT
- 2 - PRINTER OUTPUT
- . . . Use Function Keys 1 thru 2 to SELECT OPTION . . .

Press the function key corresponding to the output device desired.

If screen output is selected, the card images of the selected deck are displayed on the screen. The bottom line prompt reads:

. . . . . PRESS ANY KEY TO STOP/START SCROLL . . . . .

Any key can be used to toggle the screen scrolling OFF or ON. That is, if lines are being written on the screen, pressing any key will stop the screen writes. By pressing any key again, the screen writes are continued. After the last card of the deck has been written on the screen, the bottom line reads:

. . . . . PRESS ANY KEY TO EXIT . . . . .

When the printer is selected as the output device, the user is prompted to specify single- or double-spaced output:

DOUBLE OR SINGLE SPACED OUTPUT?

ENTER '2' FOR DOUBLE SPACE (Default = Single Space)

All card images from the selected deck are printed single- or double-spaced as specified. There is no further user action required.

**5.3.1.6.3 Deleting a Formatted Deck.** Any deck formatted for input to the NEC program via Sub-Option 1 (Section 5.3.1.6.1) can be deleted when no longer needed in order to free up disk space.

The user is prompted to select the NEC input deck to be deleted:

ENTER NAME OF DECK TO DELETE OR <CR> TO SEE LIST

This is the name of the deck you want to work with

The user has two methods of selecting the deck to be deleted:

- a. Enter the user-assigned name of the formatted deck to be deleted.
- b. Press <Return> to view the list of all formatted decks. Type the number corresponding to the deck to be deleted, followed by <Return>.

The specified deck is retrieved and the first screen page of card images is displayed. Examine the display carefully, then respond to the prompt at the bottom of the screen:

ARE THESE THE FORMATTED CARDS YOU WANT TO DELETE?  
TYPE 'DEL' TO CONFIRM DELETION ACTION - ANY OTHER KEY TO EXIT

If the card images displayed are from the deck you want to delete, type 'DEL' <Return> to delete this deck from the disk.

CAUTION: Be sure this is the deck you want erased before confirming the deletion request. If a deck is mistakenly deleted, it can be recovered by reformatting it via Sub-Option 1, providing the three subdecks are still resident on disk.

5.3.1.6.4 Appending to a Formatted Deck. This function allows the user to format and append one input deck to an already formatted NEC input deck.

First, the user is prompted to select the formatted deck to append to:

ENTER NAME OF DECK TO APPEND TO OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

There are two methods of specifying the deck to append to:

- a. Enter the name of the formatted deck to which you want to append another deck.
- b. Press <Return> to display the list of formatted decks. Type the number corresponding to the deck to be appended to, followed by <Return>.

Next, the user is prompted to indicate if a comma is to be used as a separator between the card code and the first data fields in the deck(s) being appended:

FORMAT WITH COMMA AFTER CARD CODE?  
ENTER 'Y' TO SEPARATE CARD CODE FROM DATA FIELDS WITH A COMMA

If 'Y' is input, all card images appended to the specified formatted deck will be formatted with a comma between characters two and three. Otherwise, there will be no delimiter between the second and third characters.

**IMPORTANT:** The format type specified must be the same as was used when the first specified deck was formatted.

The user is then prompted to:

ENTER THE NAME OF THE DECK TO APPEND

This is the name of the deck you want to work with

Specify the name of the deck to append in the same way as the deck to be appended to (described above). The name specified must have a Comment, Geometry, and Program Control subdeck associated with it. These subdecks are formatted and appended to the end of the previous deck. The two decks are separated with an 'NX' (Next Structure) card. (This card replaces the 'EN' card at the end of the deck being appended to.)

After the second structure has been appended to the first, the user is asked if another structure is to be appended:

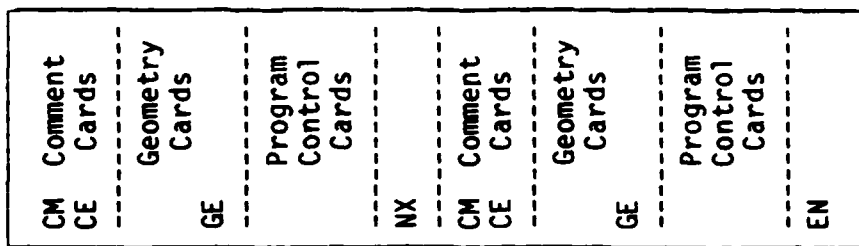
DO YOU WANT TO APPEND A DECK FOR ANOTHER STRUCTURE?

ENTER 'Y' TO APPEND A DECK

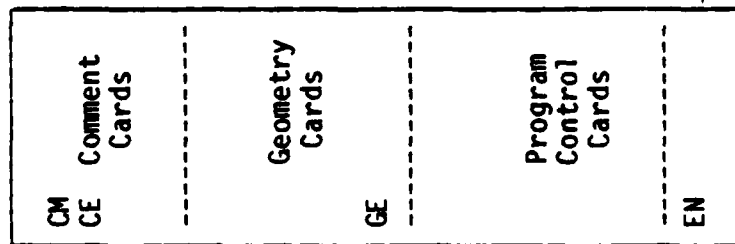
If the response is 'Y', the user is asked to specify the next deck to be appended to the previous structures. This process continues until the user responds with 'N' (or any character other than 'Y') to the above prompt. The system then ensures that the last card in the multistrukture deck is an 'EN' card.

**NOTE:** The deck chosen to append to must be a previously formatted deck, while the deck(s) chosen to be appended must be unformatted Comment, Geometry, and Program Control subdecks (see Figure 5-9).

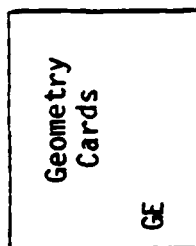
"DECKNAME1"  
New Formatted  
NEC Input  
Deck



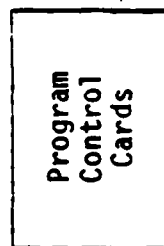
Formatted  
NEC Input  
Deck



+



+

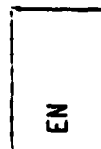


"DECKNAME2"  
(Deck to be  
Appended)



(If Another  
Structure  
is to be  
Appended)

or



(If no More  
Structures  
to be  
Appended)



(Next Structure  
Card Replaces  
EN Card)

"DECKNAME1"  
(Deck to Append  
to)

Figure 5-9. Appending Structures for NEC Input

5.3.1.6.5 Editing a Formatted Deck. Once a deck has been formatted for input to the NEC program, it can be edited using CARD EDITOR Option 6.5. The user is prompted to enter the name of the formatted deck to be edited:

ENTER NAME OF FORMATTED DECK TO EDIT OR <CR> TO SEE LIST  
This is the name of the deck you want to work with

The user has two methods of specifying the deck to be edited:

- a. Enter the name of the deck to be edited.
- b. Press the <Return> key to view a list of all formatted decks. To select one of these decks, type the number corresponding to the deck to be edited, followed by <Return>.

After the deck has been selected, it is retrieved and the first screen page of card images is displayed. At the top of the screen is the first-level edit prompt:

Use ↓ or ↑ to find line - F1 thru F8 to select function

The edit function is described in detail in Section 5.3.1.2 (EDIT EXISTING DECK).

Be very careful to maintain the format of the card images in the formatted deck.

5.3.1.6.6 Preparing a Deck for Transmission. When a deck has been formatted for input to the NEC program (via CARD EDITOR Option 6.1), it is written to a random disk file. This file can be edited, displayed, deleted, and appended to, as necessary. When this data set is ready for input to the NEC program, it must be written to a sequential file before transmission to the NEC host computer. This is accomplished by way of the CARD EDITOR's Option 6.6 (PREPARE DECK FOR TRANSMISSION).

The user is prompted to:

ENTER NAME OF DECK TO TRANSMIT OR <CR> TO SEE LIST  
This is the name of the deck you want to work with



The user has two methods for specifying the deck name:

- a. Enter the name assigned by the user when the deck was created.
- b. Press <Return> to display the list of all formatted decks and type the number corresponding to the deck to be transmitted, followed by <Return>.

Once the formatted deck has been selected, the following is displayed on the screen:

ENTERING A VALID FILENAME

- Maximum = 8 characters
- Do not add a file type extension
- Do not include embedded spaces
- Start with a letter
- Use letters and numbers only

ENTER FILENAME:

ENTER UP TO 8 CHARS or <Return> FOR LIST OF EXISTING NAMES

The user is being instructed to enter a name for the sequential file that will be transmitted to the NEC host computer. Guidelines are provided on the screen. The file type extension is provided by the system - it is always .NEC, therefore, the user is not to enter this as part of the filename.

The deck name can be used as the filename if it is a valid filename according to the rules outlined above (also as described in the BASIC manual supplied with the computer). Otherwise, the user needs to come up with another name. Once the name is entered, the system checks to see if that name has already been used. If it has, a warning message is displayed:

(filename) Already exists - Do you want to OVERWRITE it?  
Enter 'Y' to overwrite (filename)

If 'Y' is entered to the above question, the file previously created with this name will be deleted and there is NO RECOVERY. If the user does not want to delete the old file with the specified filename, the prompt should be answered with 'N' (or any key other than 'Y'). The user will then be reprompted for filename entry.

As soon as a valid filename has been entered (and confirmed), the card images from the specified formatted deck are read one at a time and are rewritten to the current disk as a sequential file with the user-assigned filename. A card image count is displayed on the screen during this process.

IGUANA provides no capabilities for editing, displaying, or otherwise tampering with the sequential files created for transmission to a NEC host computer. To perform any of these functions, the user will need to exit to DOS and use DOS commands and a line editor (such as EDLIN).

The user is responsible for remembering the names he has assigned to the sequential files created via this option when transferring these files to a NEC host for processing (see Section 5.3.4).

**5.3.1.6.7 Deleting a Transmit Deck.** The sequential files created via Sub-Option 6 (see Section 5.3.1.6.6) can be deleted when no longer needed to free up disk space.

The user is prompted to select the transmit deck to be deleted:

```
ENTER NAME OF TRANSMIT DECK TO DELETE OR <CR> TO SEE LIST
This is the name of the sequential file you want to delete
```

The user has two methods of selecting the deck to be deleted:

- a. Enter the user-assigned name of the transmit deck.
- b. Press <Return> to view the list of all transmit decks and type the number corresponding to the deck to be deleted, followed by <Return>.

The specified deck is retrieved and the first screen page of card images is displayed. The user should examine the display carefully, then respond to the prompt at the bottom of the screen:

ARE THESE THE TRANSMIT CARD IMAGES YOU WANT TO DELETE?  
TYPE 'DEL' TO CONFIRM DELETION ACTION - ANY OTHER KEY TO EXIT

If the card images displayed are from the deck to be deleted, type DEL <Return> to delete this deck from the disk.

CAUTION: Be sure this is the deck to be erased before confirming the deletion request. If a transmit deck is mistakenly deleted it can be recreated via Sub-Option 6, providing that the corresponding formatted deck is still resident on disk.

5.3.1.6.8 Translating a File from Another Source. This function provides a means for translating NEC input data sets (either those created via IGUANA or those created on another computer) into a format which can be read and edited via the IGUANA CARD EDITOR. The translated file becomes a Formatted Deck, and can then be retrieved, edited, printed, and deleted like any IGUANA Formatted Deck via Option 6.

The user is prompted for the name of the sequential file to be translated:

ENTER NAME OF SEQUENTIAL FILE TO BE TRANSLATED:  
This is the name of the data set retrieved from another source

Use the full filename; for example, "ANTENNA1.EXT" if the file is on the system disk or "A:ANTENNA1.EXT" if the file is on a floppy diskette which has been loaded in the floppy drive.

A list of the current names of formatted decks is presented on the screen and the user is prompted to:

ENTER NAME FOR NEW FORMATTED DECK:  
ENTER UP TO 10 CHARACTERS FOR NEW DATA SET NAME

Type the name for the translated deck or use <Return> to display another page of existing names (if any). A name that has been used already can be assigned for the formatted deck, in which case the user is warned that the name has already been used and is asked if that file is to be overwritten.

As the sequential file is being translated into a formatted data set, the old and new names are displayed on the screen along with the number of the image currently being translated. When the operation is complete, the NEC Input Deck Maintenance Menu is displayed on the screen, ready for the next operation.

#### 5.3.1.7 Option 7 - DISPLAY DECK FILE STATUS

##### Function

Option 7 is used to display or print a list of all existing subdecks and formatted NEC input decks. The user-assigned name for each is presented, along with the card image counts for the Comment, Geometry, Program Control, and formatted subdecks (see Figure 5-10).

##### Access

Press <F7> from the Option Menu (Figure 5-3).

The user is prompted to specify the output device:

- 1 - SCREEN OUTPUT
- 2 - PRINTER OUTPUT

. . . Use Function Keys 1 thru 2 to SELECT OPTION . . .

Press the function key corresponding to the output device desired.

# NEC INPUT DECKS

DECK NAME	COMMENT CARDS	GEOMETRY CARDS	PROGRAM CTRL CARDS	FORMATTED CARDS
ANT1	0	6	0	0
ANT2	2	31	3	36
ANT3	0	0	4	0
NEW1	2	4	3	0
NEW2	2	4	3	18
WIRES	0	3	0	0

Figure 5-10. File Status Display Printout

If SCREEN OUTPUT is selected, the deck file status is displayed on the screen.  
The bottom line prompt reads:

. . . . . PRESS ANY KEY TO STOP/START SCROLL . . . . .

Any key can be used to toggle the screen scrolling OFF or ON. That is, if status lines are being written on the screen, pressing any key will stop screen writes. By pressing any key again, the screen writes are continued. After the last status line has been written on the screen, the bottom line reads:

. . . . . PRESS ANY KEY TO EXIT . . . . .

When the printer is selected as the output device, the user is prompted to specify single- or double-spaced output:

DOUBLE OR SINGLE SPACED OUTPUT?

ENTER '2' FOR DOUBLE SPACE (Default = Single Space)

The file status display is output to the printer single- or double-spaced, as specified. No further user action is required.

#### 5.3.1.8 Option 8 - DISPLAY/UPDATE NEC HOST TABLE

##### Function

In order to send prepared NEC input data sets to a host computer or to capture NEC results from a NEC host for plotting on the PC-XT a communications package, CROSSTALK-XVI, has been incorporated into the IGUANA system. CROSSTALK employs Command and Script files and user-prepared special purpose files to automate computer dial-up, log-on, and file transfer functions. These special purpose files are stored on disk and can be invoked with CROSSTALK, eliminating much of the user interface with CROSSTALK.

The NEC Host Table is maintained by the user and can hold up to 20 computer host names, Command file names, and a brief functional description of each. When the file transfer function is invoked from the Initial Option Menu (Function 4), this table is displayed so that the user may select the Command file, if any, to be loaded and executed with CROSSTALK. The NEC Host Names and functional description for each are included in the table for the user's benefit only. CROSSTALK uses only the Command file name in the far left column when the user makes a selection from this table.

Option 8 is used to display and maintain the current contents of the NEC Host Table.

### Access

Press <F8> from the Option Menu (Figure 5-3).

The current contents of the NEC Host Table are displayed on the screen; the current cell is displayed in reverse video. Use the cursor control (arrow) keys to move to the cell you want to change. As the current cell position is changed, the input prompt at the bottom of the screen displays the appropriate message for the changing of the cell.

To change the contents of the current cell, type the new name or description in response to the prompt at the bottom of the screen and press <Return> to enter the change into the cell. The table has the following limits:

<u>Cell</u>	<u>Maximum Character Count</u>
NEC Host Name	15 (any characters)
Functional Description	40 (any characters)
CROSSTALK Command File	8 (valid filename)*

- \* Refer to Appendix A and the CROSSTALK manual for more details on Command file names. Command files, when they are created, always have the form nnnnnnnn.XTK, where .XTK is the filename extension. Do not include the extension in this table when entering Command file names in the left column.

To delete a table item altogether (all three cells for a given entry), position the cell marker on any of the three cells of that entry and press the <Del> key.

When all updates to the table have been made, press the <End> or <Return> key to save the updated table on disk and return to the Option Menu.

The <Esc> key can be pressed at any time BEFORE the table is written to disk to abort out of the update function - none of the changes made to the table since this function was invoked will be written to disk.

#### 5.3.1.9 Option 9 - ARCHIVE/RESTORE DECKS

##### Function

This option allows the user to selectively save subdecks on a floppy disk (diskette), delete these archived subdecks from the main (system) disk if desired, and restore previously archived subdecks onto the system disk. To use Option 9's Archive function, a formatted diskette must be on hand. The following steps are used when formatting a diskette.

- a. Use Function 7 from the Master Menu: EXIT TO DOS
- b. The screen will read: C>
- c. Type: A:  
This changes the default drive from C: to A: as a precaution.
- d. The screen will read: A>
- e. Place the diskette to be used for archiving in the floppy drive and close the door.
- f. Type: FORMAT A:
- g. A message will be displayed on the screen when the diskette has been formatted.

#### \*\*\*\*\* WARNING \*\*\*\*\*

It is extremely important to follow the above instructions when formatting a diskette. If the drive designator is incorrect, the user could format the system disk - ERASING THE ENTIRE SYSTEM !!!



To use Option 9's Restore function, the user must already have a diskette that has been used to archive subdecks.

### Access

Press <F9> from the Option Menu (Figure 5-3).

The user is prompted to specify the operation to be performed:

#### ARCHIVE FUNCTIONS

- 1 - WRITE DECK(S) TO FLOPPY DISK
- 2 - RESTORE DECK(S) FROM FLOPPY TO FIXED DISK

Press the function key corresponding to the sub-option choice desired.

5.3.1.9.1 Writing Deck(s) to a Floppy Disk (Archiving). When Sub-Option 1 is selected from the Archive Function Menu, the names and card counts for each of the existing Comment, Geometry, and Program Control subdecks are displayed on the screen (to see more, use the <Return> key). The user is prompted to select the subdecks to be archived. The formatted decks and the transmit decks cannot be archived. Any cards which exist for the same selected deck name will be archived; i.e., the user cannot select to archive the Comment Cards from a deck and not the Geometry or Program Control Cards.

To select subdecks for archiving:

- a. Use the Down and Up Arrows, <↓> and <↑>, to highlight the line for the subdecks to be archived.
- b. When the desired subdeck is highlighted, press <+> to mark it to be archived. This line will be marked with an \*.
- c. To select ALL subdecks on the system disk for archiving, press <A> instead of locating a specific deck name and pressing <+>.

To deselect subdecks which have been marked for archiving:

- a. Locate the starred line to be deselected using the <↓> and <↑> keys.
- b. When the appropriate line has been located (it is highlighted), press <-> to deselect it. The \* is erased from this line.

When all selections have been made, press the <End> key to start the archiving process.

A formatted diskette must now be loaded into the floppy drive (drive A:); see 5.3.1.9 for instructions for formatting a diskette. This will be the Archive diskette. The user is prompted to indicate when the diskette is ready for archiving:

Place FORMATTED Diskette in Drive A:  
Press <Return> when READY  
(Press <Esc> to ABORT)

If the <Esc> key is pressed, no archiving is performed; the Archive Function Menu is redisplayed.

When the <Return> key is pressed, the archive function begins. As the selected decks are being read from the fixed disk and written to the floppy disk, the screen display shows the current deck name, deck type (Comment, Geometry, or Program Control) and record number.

After all selected decks have been archived, the user is asked whether the archived decks are now to be deleted from the system disk:

DO YOU WANT TO DELETE THE ARCHIVED FILES FROM THE FIXED DISK?

Type DELETE to erase archived decks from fixed disk  
Type SAVE to keep archived decks on fixed disk

DELETE or SAVE ARCHIVED DECKS?

If the user types DELETE, all decks which have been archived on the floppy disk will be deleted from the fixed disk. If a formatted deck exists for an archived deck, the formatted deck will NOT be deleted. To retain all archived decks on the fixed disk, type SAVE.

NOTE: If the diskette fills up before all decks have been archived, the user is notified via a screen message. The DELETE function will not erase decks which have not been successfully archived.

5.3.1.9.2 Restoring Deck(s) to the Fixed Disk. When Sub-Option 2 is selected from the Archive Function Menu, the user is prompted to load the Archive diskette in the floppy drive (drive A:). An Archive diskette is any floppy disk which has previously been used to store decks via the Archive function. The screen display shows:

Place ARCHIVE Diskette in Drive A:  
Press <Return> when READY  
(Press <Esc> to ABORT)

If the <Esc> key is pressed, no restoring is performed; the Archive Function Menu is redisplayed.

When the Archive diskette is loaded on the A: drive and <Return> is pressed, the names and card counts for each of the existing Comment, Geometry, and Program Control subdecks are displayed on the screen (to see more, use the <Return> key). The user is prompted to select the deck(s) to be restored. All cards for each of the existing subdecks with the selected name will be restored to the fixed disk. In other words, the user cannot choose to restore only the Comment Cards if Geometry and Program Control Cards also exist for the selected deck name.

To select and deselect decks to be restored, use the same procedures described for selecting decks for archiving (Section 5.3.1.9.1).

When the selection process is completed, press the <End> key to restore the selected deck(s). If a name of the deck to be restored already exists on the fixed disk, the user is prompted to rename the deck being restored so that no data will be inadvertently overwritten. As soon as a name is input that does not conflict with the deck names on the fixed disk, the restore process continues. As a deck is being read from the floppy disk and written to the fixed disk, the name and record count of each of the existing subdecks are displayed on the screen.

5.3.2 MODEL MAKER Function. The MODEL MAKER is used to enter, edit, and display the information required for the generation of a three-dimensional wire model. Four options are provided:

- 1 - ENTER NEW MODEL
  - 2 - WORK WITH OLD MODEL
  - 3 - BUILD MODEL FROM GEOMETRY CARDS
  - 4 - ARCHIVE/RESTORE MODELS
- 
- a. ENTER NEW MODEL consists of digitizer input of Top and Side View drawings and the specification of section boundaries perpendicular to the X axis on the Side View. When entering a new model, the system automatically takes the user through all steps required for building a 3-D model. However, the user can choose to stop after Side View sectioning to continue model generation using the WORK WITH OLD MODEL Option. The user must have identically scaled drawings of the Top and Side View before starting model entry.
  - b. WORK WITH OLD MODEL allows the user to pick up the model build process at any one of the (completed) five stages. There are many functions available for editing, displaying, and restructuring the model. These are described in detail under MODEL MAKER Option 2.
- IMPORTANT: Sections 4.2.2 and 4.2.3 describe digitizer and mouse input procedures used throughout the MODEL MAKER function. Review and understand these procedures before attempting to use the MODEL MAKER.
- c. BUILD MODEL FROM GEOMETRY CARDS provides the capability for generating a three-dimensional model (which can be rotated, zoomed, plotted, edited, etc.) from a Geometry subdeck. This is an efficient way to edit and recreate data sets generated on other computers (i.e., model input was not via IGUANA).
  - d. ARCHIVE/RESTORE MODELS allows the user to selectively save models on a floppy disk, delete these archived models from the hard (system) disk if desired, and restore previously archived models onto the system disk.

### 5.3.2.1 Option 1 - ENTER NEW MODEL

#### Function

MODEL MAKER Option 1 is used to begin entry of a model into the system. There are three types of models, each with different input requirements:

- 1 - STRUCTURE
- 2 - TOWER
- 3 - POLE

Normally, the new models will be entered as Structures; however, Tower and Pole input is provided for these special shapes:

Tower - like a radio tower in shape with multiple identical sides. When creating a tower, only one view is required. This view is laid on the X axis perpendicular to the user's line of sight.

Pole - or mast requires input of a center pole and a wire or wires in the same vertical plane. The user specifies where these wires are to be duplicated around the pole. The user may then specify a different set of wires in another vertical plane and duplicate these around the center pole. This process can be continued until all wires have been specified.

The steps involved in entering a new model include:

- a. Setting the digitizer resolution (tolerance); refer to Section 5.3.3 to SET DEFAULT VALUES.
- b. Digitizer Setup; refer to Section 4.2.2 for details.
- c. Input of points (and resultant wires) describing the Top View of the structure (not applicable for poles and towers).
- d. Edit (including alignment) of Top View (not applicable for poles and towers).
- e. Input of points (and resultant wires) describing Side View.

NOTE: From this point, all processes are applicable for Structure input only.

- f. Edit (including alignment) of Side View.
- g. Sectioning of Side View.
- h. Input of wires to describe each Section View.
- i. Generation (automatic) of three-dimensional sections from Top, Side, and Section View data.
- j. Edit of three-dimensional sections, one at a time, to delete unwanted points and lines.
- k. Generation of a three-dimensional model from the edited three-dimensional sections.

During the model building processes, input data is saved in various files on the disk:

- a. 2-VIEW file - holds the Top and Side View and section boundary data; i.e., all data entered through step g., above.
- b. SECTIONS file - holds the data entered for each section in step h., above.
- c. 3-D SECT NO EDIT file - holds the data generated during step i., above, for each section.
- d. 3-D SECT EDIT file - holds the data resulting from the editing of each section in step j., above.
- e. MODEL file - holds the data generated during the assembly of a three-dimensional model from the edited 3-D sections in step k., above.

When entering a new model, the user must complete at least through step g., such that the 2-VIEW file can be created. At this point, the user can exit the MODEL MAKER and return at some other time to continue model building at step h., or whichever step is the next step in the build process. The functions provided under MODEL MAKER Option 2 (WORK WITH OLD MODEL) allow the user to pick up from any of the saved files and continue through the build process. Therefore, these functions (steps h. through k.) will be discussed under Option 2.

## Access

Press <F1> from MODEL MAKER Option Menu.

The user is then prompted to enter a name for the model; this can be anything up to 20 characters long.

Next, the data entry options for the new model are displayed and the user is prompted to select the data entry option desired:

- 1 - STRUCTURE
- 2 - TOWER
- 3 - POLE

Based on the entry type selected, the Digitizer Setup procedure prompts the user for the entry of the information required for defining the origin, coordinate system, scale, register point and plane(s) of symmetry (if any) for the point (and wire) input. This is described in detail in Section 4.2.2.

### 5.3.2.1.1 Enter Structure Data

#### Function

After Digitizer Setup has been accomplished (see Section 4.2.2), Top View point entry begins. After all Top View points (and resultant wires) have been input, the system goes into edit mode for that view. The vertical points are automatically aligned (using the digitizer tolerance established via the SET DEFAULT VALUES function). If the vertical points are not aligned to the user's satisfaction, manual alignment can be accomplished using the mouse. The user then has the choice of using automatic or manual horizontal point alignment. (Caution: Auto-alignment will place all points within the given digitizer tolerance on the same vertical line.) After points are aligned horizontally and vertically, the Top View should be plotted and examined. The user is allowed to edit and plot until the Top View is satisfactorily completed.

Next, the Digitizer Setup process is repeated for the Side View. When that has been completed, the user enters the Side View points in the same way as for the

Top View. For Side View point entry, however, the system does not accept a point which does not have a corresponding X coordinate in the Top View. (Point correspondence is based on the digitizer tolerance. If the tolerance is large, Side View point entry is easier but there is an increased risk of matching to the wrong Top View point.)

**IMPORTANT:** Because of the point-matching requirement, the user must be sure when entering the Top and Side Views that all hidden wires and end-on wires (Figure 5-11) are input.

For points appearing in the Top View which have no corresponding point in the Side View, the system draws a dotted line where it assumes a missing wire should be. The user must add points and wires on the Side View to complete the view before exiting. Even if the point does not belong in the Top View, the Side View must be completed using this point. The Top View can then be edited for this extra point, automatically deleting the erroneous wire from the Side View. Side View editing is the same as for the Top View except there is no vertical alignment. (Vertical alignment is forced when points are matched to the Top View on input.)

After the Top and Side Views have been completed, the Side View must be sectioned. This involves the placement of section lines perpendicular to the X axis. Two options are available: automatic sectioning whereby a section line is placed through every point perpendicular to the X axis; and manual, which allows the user, with the aid of the mouse, to define the section boundaries. In either case, sections are defined as the section boundary and all wires to the left of that boundary (up to the next section line to the left). A section line must not be placed at the left-most end of the Side View (see Figure 5-12).

Once the section lines have been defined, the Top and Side View data is saved in a 2-VIEW file under the name given to this structure. The user has the option of continuing through section entry and edit and generation of the 3-D model, or stopping at this point and picking up at a later time with the section entry function under the WORK WITH OLD MODEL option. Therefore, all further processing is discussed under that option.



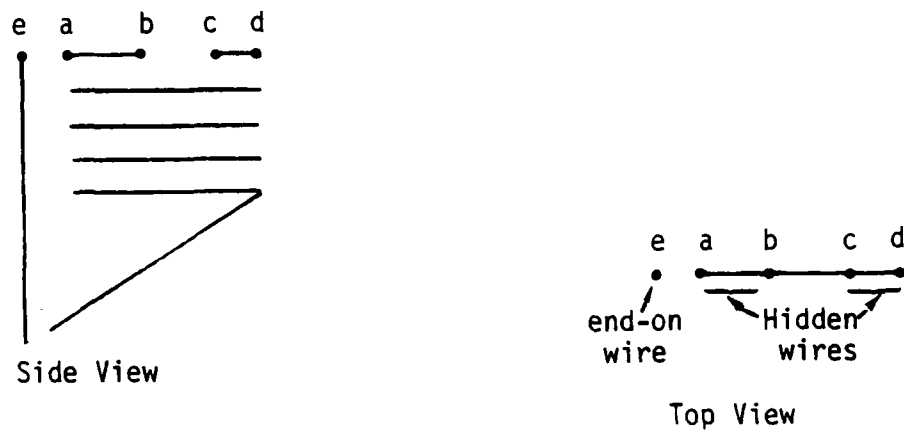


Figure 5-11. Hidden and End-On Wires

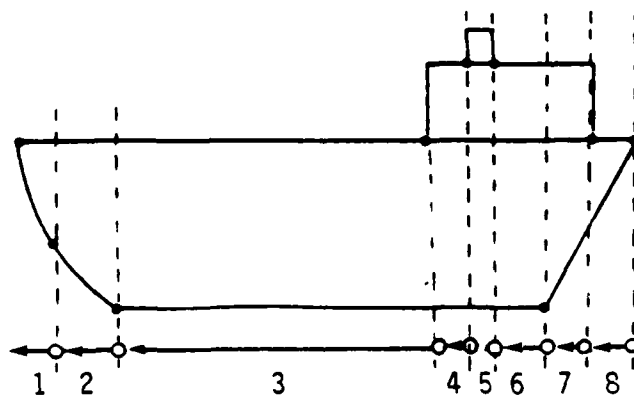


Figure 5-12. Section Boundaries

## Access

Press <F1> from the MODEL MAKER Option Menu (ENTER NEW MODEL).

The user is prompted for input of a name for the new model. Enter up to 20 characters as a model name.

The Sub-Option Menu is then displayed; Press <F1> (STRUCTURE) from this menu.

The Digitizer Setup process is begun for initializing the digitizer for Top View input. (See Section 4.2.2).

## Operation

Follow the steps outlined in Section 4.2.2 to set up the digitizer (and the drawing) for Top View entry. Once the Setup procedure has been successfully completed, point entry may begin.

**IMPORTANT:** When using the digitizer to enter points, hold the digitizer pen the same way for each point. That is, attempt to keep the digitizer pen at the same angle and in the same direction relative to the digitizer bar. A small change in the relative position of the pen can make point entry and edit much more difficult - especially when entering the Side View.

### a. Point Entry (Top View)

1. The user receives a prompt on the bottom of the screen accompanied by an audible tone:

ENTER START POINT:

2. Place the digitizer pen on the point in the drawing which starts a line (wire) and push down on the pen. A point is placed at the corresponding screen location.

**NOTE:** Points and wires may be entered in any order.

3. When the system has accepted that point, the user receives a second prompt accompanied by a different audible tone:

ENTER END POINT:

4. Position the digitizer pen on the point in the drawing which ends the wire just started by the previous input and push down on the pen. A wire is drawn on the screen between the last start point and this end point.
  5. The prompts for entering the start and end points are presented alternately while the user continues entering each point on the Top View. (In a short time, the user will learn to use the audible tones as the prompts and will not need to look at the screen at all.)
  6. During point entry, the user has two alternatives to entering a point with the digitizer pen in response to a prompt:
    - a) <L> - the <L> key can be used in response to the start point prompt, to automatically use the last entered end point as the next start point to "continue line." (The <L> is ignored if entered in response to the ENTER END POINT prompt.)
    - b) <Back Space> - this key can be used to erase the last start point (in response to ENTER END POINT) and a new start point is requested. If <Back Space> is pressed in response to the ENTER START POINT prompt, the entire line preceding the last end point is erased and a new end point is requested.
  7. Point entry continues in this manner until all points have been input. When done with point entry, the user presses the <End> key in response to the point entry prompt. The system then goes into the edit mode for this view.
- b. Edit Top View
1. Once the user presses the <End> key in response to the point entry prompt, the system automatically switches to edit mode for the Top View and performs vertical alignment on all points. The alignment process uses the digitizer tolerance established via the SET DEFAULT VALUES function to eliminate point entry errors caused by the digitizer pen position.

2. The user should then carefully examine the figure on the screen to determine if all points which should be aligned vertically actually have been. If not, the user must perform manual vertical alignment.
3. When the user opts for manual alignment, cross hairs are positioned on the screen.
4. Use the mouse to position the cross hairs anywhere on a line having points requiring alignment. (See Section 4.2.3 for cross hairs movement.)
5. Once the cross hairs have been correctly positioned, press one of the two buttons on the front of the mouse, hooking that line. The system now employs four times the screen resolution for point alignment selections.
6. A marker is placed at the bottom-most point as defined by the cross hairs placement.
7. The user must now specify the action to be taken on that point by pressing:
  - a) <A> - align this point; point is marked for alignment and marker moves to the next point up
  - b) <U> - don't align this point; the point is left as is and marker is moved to the next point up
  - c) <L> - align all points marked with <A> and processing returns to Step 3
  - d) <End> - done with manual alignment process; begin horizontal alignment
8. After vertical alignment has been accomplished, the user has the option of performing automatic and/or manual horizontal alignment.

CAUTION: Automatic horizontal alignment can distort the figure, depending on the pre-established digitizer tolerance.

9. Manual horizontal alignment is done in the same manner as vertical alignment except that the marker is moved from left to right instead of bottom to top on the screen.
10. After both vertical and horizontal alignment have been performed, plot the view, watching the plotter movements carefully to ensure that all necessary lines (especially hidden lines) have been entered.

11. Examine the plotter output carefully. If the figure has extra wires or if it is missing wires, you will need to DELETE from and/or ADD to the view.
12. To ADD a wire to the view, select the ADD function at the bottom of the screen.
13. Use the mouse as described in Section 4.2.3 to position the cross hairs on each of the two endpoints of the new line; press either of the mouse buttons to hook each point. A new line is added to the structure between the two hooked points.
14. To DELETE a point or wire from the view, select the DELETE function at the bottom of the screen.
15. Use the mouse as described in Section 4.2.3 to position the cross hairs on the point or line to be deleted and press either of the mouse buttons to hook this point or line; the line or point is deleted.

NOTES:

- (1) If the hooked wire overlaps another wire, the wire that was input first is deleted. If this is not the correct one to delete, use delete again to delete the one desired then, ADD back the erroneously deleted wire.
  - (2) When a point is deleted, all wires attached to that point are also deleted.
16. Continue to edit and plot this view until completely satisfied.
  17. When Top View input and edit are complete, press <End> to begin Side View input.
- c. Point Entry (Side View)
1. When the user signals the completion of Top View entry and edit, the Digitizer Setup procedure is executed to initialize the digitizer for Side View input. This is exactly like the process for Top View initialization except scale is not requested and axis of vertical symmetry is not offered as an option.

IMPORTANT: When prompted for the register point, be sure to use the SAME POINT used for the Top View. This point is used when matching Top and Side View points.

2. Point entry for the Side View is performed in the same way as for the Top View with one important exception: the system checks each point entered by the user, accepting only those having an X coordinate matching a point in the Top View. If no matching point is found in the Top View, the user input is rejected with an audible tone.
  3. Point acceptance/rejection is determined by the pre-established digitizer tolerance. If the tolerance is relatively large, point entry is easier, however, there is then a greater chance of matching to the wrong point in the Top View.
  4. When point input is complete, press <End> to switch into edit mode for the Side View.
- d. Edit Side View
1. The system attempts to match each point entered in the Side View to a point in the Top View. For any point found in the Top View which has no corresponding point in the Side View, the system draws a dotted line on the screen where it assumes a missing wire should be.
  2. The user must complete the Side View for missing wires - even if the Top View points do not belong there. The user can return to edit the Top View later to delete those points, thereby deleting any wires in the Side View connected to these points.
  3. Automatic and/or manual horizontal alignment only are provided for Side View editing, as vertical alignment is forced by the point matching requirement on point entry. Horizontal alignment is the same as described for Top View editing.
  4. As for the Top View input and edit process, plot and edit the Side View until it is correct. Press <End> to exit Side View input and edit.
- e. Define Section Boundaries
1. Once the Top and Side Views have been completed, section boundaries must be defined on the Side View. The user has two options for sectioning the structure:
    - a) Automatic - The system drops a section line perpendicular to the X axis at every X value point on the Side View, starting at the right-most end point.

- b) Manual - The system places a section line at the right-most end point on the Side View. The user then may employ the mouse and cross hairs technique to specify section boundaries.
2. For manual sectioning, use the mouse as described in Section 4.2.3 to position the cross hairs at the desired section boundary and press either of the mouse buttons to set the boundary line.

NOTE: DO NOT put a section line at the left-most end of the Side View.

3. If a section line has been entered in error, move the cross hairs to that line and hit the <Del> key to delete that line.

NOTE: The right-most section line cannot be deleted.

4. When all section boundaries have been defined, the user may plot the section boundaries or press <End> to save the Top and Side View data in a 2-VIEW file.

NOTE: For a very simple figure requiring only one section, choose the manual sectioning mode and press <End>. One section line is placed at the right-most end of the figure.

Continue New Model Input as described under MODEL MAKER Option 2 (Section 5.3.2.2).

#### 5.3.2.1.2 Enter Tower Data

##### Function

This option is provided to enable the user to generate a multi-sided tower having  $n$  identical sides (for example, a radio tower). Digitizer Setup is performed first - only the Horizontal axis of symmetry is allowed as an option. The drawing should be placed in front of the digitizer bar such that its long axis is parallel to the X axis, one side of the tower is parallel to the Y axis, and the base of the tower is to the left (see Figure 5-13).

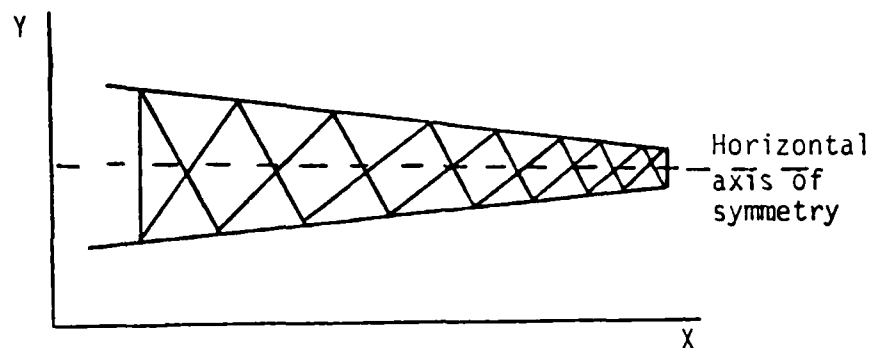


Figure 5-13. Drawing Placement for Tower Input

Point entry and edit are performed as for structures but for one view only. The user specifies the number of sides in the tower and the system automatically generates a three-dimensional tower based on this information.

#### Access

Press <F1> from the MODEL MAKER Option Menu (ENTER NEW MODEL).

The user is prompted for input of a name for the new model. Enter up to 20 characters as a model name.

The Sub-Option Menu is then displayed; Press <F2> (TOWER) from this menu.

#### Operation

- a. Initialization. Follow the steps outlined in Section 4.2.2 to set up the digitizer and proceed as follows:
  1. Establish the origin, the X axis, and the Y axis using the digitizer.
  2. Enter the length of the side in meters using the keyboard.
  3. Establish the Horizontal axis of symmetry using the digitizer or press the <Return> key for no symmetry.
  4. Press the <End> key to indicate that setup is done.
  5. Enter the register point as the lower left point of the side (tower base on left). Establish the boundaries of the side by entering, in order, the upper left point, the lower right point,



and the upper right point. If a line of symmetry has been established, the upper points should coincide (or be below) the line of symmetry. After entering the four points, a dotted outline of the side will appear on the screen.

6. Enter the number of sides using the keyboard.
7. Enter <Y> if a cap is desired.
- b. Point Entry. Point entry for Towers is the same as described for Structures (Top View point entry). If a line of Vertical symmetry has been defined, enter only those points below this line - they will automatically be reflected above the line on the screen.
- c. Edit View. Align points and ensure that the figure is correct before exiting. The system generates a three-dimensional model having the specified number of identical sides and stores it in a MODEL file. Note that it is not possible to edit the Side View after exiting.

#### 5.3.2.1.3 Enter Pole Data

##### Function

This option is provided to enable the user to generate a "maypole-like" model. A pole consists of a center pole with wires hanging off in different directions, each connecting to the ground or to another (shorter) pole. After Digitizer Setup is accomplished, the user enters the end points required to define the center pole and any wires in a single vertical plane. These wires can be duplicated around the pole and the user can specify another set of wires in a different vertical plane to be duplicated until the entire structure has been defined. The three-dimensional model is generated as the duplication parameters are specified.

##### Access

Press <F1> from the MODEL MAKER function (ENTER NEW MODEL).

The user is prompted for input of a name for the new model. Enter up to 20 characters as a model name.

The Sub-Option Menu is then displayed; press <F3> (POLE) from this menu.

The Digitizer Setup process is begun for initializing digitizer input (see Section 4.2.2).

### Operation

- a. Initialization. Follow the steps outlined in Section 4.2.2 to set up the digitizer and proceed as follows:
  1. Establish origin, X axis, and Y axis using the digitizer.
  2. Enter the height of pole in meters using the keyboard. If a scale is being used you may enter zero for the height of the pole, then enter the left and right points of the scale using the digitizer followed by the length of the scale using the keyboard.
  3. Press the <End> key to indicate that setup is done.
  4. Enter the register point as the pole base on the left side of the screen, but to the right of the Y axis and above the X axis.  
Enter the top point of the pole. A dotted line will appear on the screen.
- b. Point Entry. Point entry for poles is the same as described for structures (Top View point entry). Remember, you are entering the lines in one vertical plane.
- c. Edit View. As described for the Top View of structures, except that the only options are add lines, delete lines, and plot. When editing is done, press the <End> key.
- d. Specify Placement of Vertical Plane. Enter the start angle, the step angle, and the number of copies for this plane. For example, to have the plane pointing east, northeast, and north, enter 0, 45, 3. You may repeat the placement of the plane as often as desired. Press the <End> key when finished with this plane.
- e. Enter Additional Vertical Planes. If you wish to enter other wire patterns in different vertical planes, answer 'Y' to the question. You will then need to specify the origin, the X axis, the Y axis, and the register point as in item (a.). Note that the height of the pole, the top of the pole and <End> are not entered. Repeat steps (b.) through (d.) until all planes have been entered. Press <End> when finished. The system generates a three-dimensional model and stores it in a MODEL file. Note that it is not possible to edit the vertical plane views after exiting.

### 5.3.2.2 Option 2 - WORK WITH OLD MODELS

#### Function

MODEL MAKER Option 2 allows the user to work with model data at any of the five stages of the model generation process, providing a flexible model edit capability. The operations allowed for each of the files marking the five stages are:

	<u>Paragraph</u>
a. 2-VIEW	5.3.2.2.1
1. ENTER SECTION DATA	5.3.2.2.1.1
2. EDIT FILE	5.3.2.2.1.2
3. COPY FILE WITH NEW NAME	5.3.2.2.1.3
4. DELETE FILE	5.3.2.2
b. SECTIONS	5.3.2.2.2
1. GENERATE 3-D SECTIONS	5.3.2.2.2.1
2. EDIT FILE	5.3.2.2.2.2
3. DELETE FILE	5.3.2.2
c. 3-D SECT NO EDIT	5.3.2.2.3
1. EDIT FILE	5.3.2.2.3.1
2. DELETE FILE	5.3.2.2
d. 3-D SECT EDITED	5.3.2.2.4
1. GENERATE MODEL	5.3.2.2.4.1
2. DELETE FILE	5.3.2.2
e. MODEL	5.3.2.2.5
1. LOOK AT FILE	5.3.2.2.5.1
2. EDIT FILE	5.3.2.2.5.2
3. COPY FILE WITH NEW NAME	5.3.2.2.5.3
4. GENERATE GEOMETRY DECK	5.3.2.2.5.4
5. DELETE FILE	5.3.2.2
6. ASSEMBLE MODELS	5.3.2.2.5.5
7. RE-SORT MODEL	5.3.2.2.5.6

The DELETE FILE function is the only function available for all file types. It is, therefore, discussed here and not repeated under each of the file sub-option descriptions to follow.

### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

The user is prompted for entry of the name of the model to be worked with. If the name is not known, press <Return> to scan all model names. When the model name is identified, enter the index corresponding to that model on the displayed list.

The file status display for the selected model is presented on the screen:

#### MODEL-X FILE STATUS

1	MODEL-X	2 VIEW	DATA
2	MODEL-X	SECTIONS	DATA
3	MODEL-X	3-D SECT NO EDIT	DATA
4	MODEL-X	3-D SECT EDITED	DATA
5	MODEL-X	MODEL	NO DATA
6	DELETE FILE		

Select the file to be worked with from this status display (any file with a DATA status is valid) by pressing the corresponding function key. The sub-options available for the selected file are displayed as described on the previous page.

### DELETE FILE

#### Function

The DELETE FILE function allows the user to selectively delete obsolete files thereby freeing up disk space. This function should be used with extreme care as once a file is deleted it cannot be recovered.

### Access

Follow the ACCESS instructions for Option 2.

Select the file to be deleted (1, 2, 3, 4, or 5).

Select the DELETE FILE function from the Sub-Option Menu (the function key varies depending on the file type selected for deletion).

#### Operation

The user gets a chance to change his mind before the specified file is deleted. To confirm the deletion request and complete the action, the user must type:

DEL <Return>

NOTE: The <Del> key will not cause file deletion.

If you decide not to delete this file, press <Return>.

#### 5.3.2.2.1 2-VIEW File Operations

##### Function

A 2-VIEW file is created at the completion of new model data entry and consists of the Top and Side View points and wires and the section boundary information for a given model. The following functions are available for any 2-VIEW file:

- a. ENTER SECTION DATA - the user is required to define the End View for each defined section in the model (with points and wires placed in the Y-Z plane).
- b. EDIT FILE - the Top and Side Views can be edited to add or delete points and/or wires and the Side View can be resectioned.
- c. COPY FILE WITH A NEW NAME - the 2-VIEW file can be copied and renamed, thereby allowing the user to edit the Top and Side Views to generate a slightly different structure while leaving the original file intact.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Press <F1> for the 2-VIEW file for that model.

### 5.3.2.2.1.1 Enter Section Data

#### Function

This option provides the user with the means for describing each of the defined sections (one at a time) for a given model.

The computer generates a tentative drawing of the End View of each section, based on the Top and Side View entry and section boundaries. The screen represents the Y-Z plane. The user is required to edit this tentative view to complete the End View for each section. Generally, this tentative view should be a fairly accurate representation of the End View; however, wires which appear in the Top and Side Views as vertical lines with the same X coordinates are represented in the tentative view as a rectangle and may require editing. See Figure 5-14 for a graphic representation of this problem. If the tentative view is missing wires that should be included, it is very likely that the wire is missing in the Top or Side View as well. It will be necessary to edit the appropriate view for the missing wire.

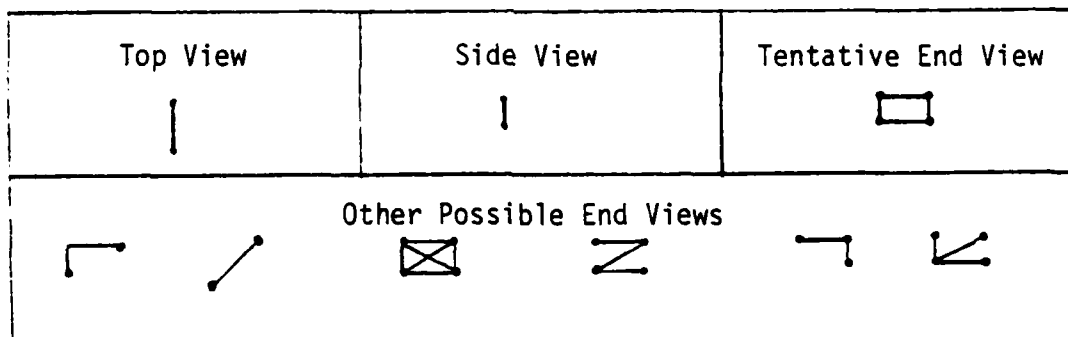


Figure 5-14. Sample End View Generation Problem

#### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Press <F1> for the 2-VIEW file for that model.

Press <F1> from the Sub-Option Menu (ENTER SECTION DATA).

## Operation

Complete the following steps:

- a. A tentative drawing of the End View of the section is displayed on the screen.
- b. Remembering that you are looking at the Y-Z plane (End View), decide whether wires must be added or deleted.
- c. If a wire needs to be added, press <1>.
  1. Using the cursor keys, position the displayed marker to a point which is to start a wire:

<←> - marker left

<↑> - marker up

<→> - marker right

<↓> - marker down

2. When the marker is positioned to the start point, press <H> to hook this point.
  3. Using the same cursor keys, position the marker for end point entry; press <H>. A wire is drawn connecting the two specified points.
  4. Press <End> when done adding wires to this view.
- d. If a wire needs to be deleted, press <2>. Use the mouse as described in Section 5.3.2.1.1.b, steps 14-15, to delete wires. Press <End> when done deleting wires from this view.

**IMPORTANT:** ALL WIRES MUST BE ENTERED, INCLUDING OVERLAPPING AND END-ON WIRES. (For end-on wires, position the marker at the proper point and press <H> twice.)

- e. To plot the End View of the section, press <3>.
- f. The above procedure is repeated for each of the defined sections of the structure, until all have been entered.
- g. The completed section data is used to generate 3-D sections. The system attempts to generate a 3-D section for each of the sections defined. If unsuccessful, the user will be required to re-edit the section or sections in question. When a 3-D section can be successfully generated, it is saved in the 3-D SECT NO EDIT file for that model (see Section 5.3.2.2.3).

#### 5.3.2.2.1.2 Edit 2-VIEW File

##### Function

This MODEL MAKER option allows the user to edit the Top and/or Side Views of a given model in the same way as described under Section 5.3.2.1.1. This option also provides a means to resection a model.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Press <F1> for the 2-VIEW file for that model.

Press <F2> from the Sub-Option Menu (EDIT FILE).

##### Operation

Refer to Section 5.3.2.1.1 b., d., and e. for descriptions of Top and Side View edit procedures using the mouse as an input device.

#### 5.3.2.2.1.3 Copy 2-VIEW File With New Name

##### Function

This option allows the user to copy the 2-VIEW file to a new file with a new name. This is particularly useful if a new structure is to be generated which is just slightly different from the original. After the new 2-VIEW file is created, the user can enter Section data (Section 5.3.2.2.1.1) and Edit File (Section 5.3.2.1.1) for this new file to create the new SECTIONS file for the copied structure.



## Operation

Complete the following steps:

- a. A tentative drawing of the End View of the section is displayed on the screen.
- b. Remembering that you are looking at the Y-Z plane (End View), decide whether wires must be added or deleted.
- c. If a wire needs to be added, press <1>.
  1. Using the cursor keys, position the displayed marker to a point which is to start a wire:

< ← >	- marker left	< ↑ >	- marker up
< → >	- marker right	< ↓ >	- marker down

2. When the marker is positioned to the start point, press <H> to hook this point.
3. Using the same cursor keys, position the marker for end point entry; press <H>. A wire is drawn connecting the two specified points.
4. Press <End> when done adding wires to this view.
- d. If a wire needs to be deleted, press <2>. Use the mouse as described in Section 5.3.2.1.1.b, steps 14-15, to delete wires. Press <End> when done deleting wires from this view.

IMPORTANT: ALL WIRES MUST BE ENTERED, INCLUDING OVERLAPPING AND END-ON WIRES. (For end-on wires, position the marker at the proper point and press <H> twice.)

- e. To plot the End View of the section, press <3>.
- f. The above procedure is repeated for each of the defined sections of the structure, until all have been entered.
- g. The completed section data is used to generate 3-D sections. The system attempts to generate a 3-D section for each of the sections defined. If unsuccessful, the user will be required to re-edit the section or sections in question. When a 3-D section can be successfully generated, it is saved in the 3-D SECT NO EDIT file for that model (see Section 5.3.2.2.3).

#### 5.3.2.2.1.2 Edit 2-VIEW File

##### Function

This MODEL MAKER option allows the user to edit the Top and/or Side Views of a given model in the same way as described under Section 5.3.2.1.1. This option also provides a means to resection a model.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Press <F1> for the 2-VIEW file for that model.

Press <F2> from the Sub-Option Menu (EDIT FILE).

##### Operation

Refer to Section 5.3.2.1.1 b., d., and e. for descriptions of Top and Side View edit procedures using the mouse as an input device.

#### 5.3.2.2.1.3 Copy 2-VIEW File With New Name

##### Function

This option allows the user to copy the 2-VIEW file to a new file with a new name. This is particularly useful if a new structure is to be generated which is just slightly different from the original. After the new 2-VIEW file is created, the user can enter Section data (Section 5.3.2.2.1.1) and Edit File (Section 5.3.2.1.1) for this new file to create the new SECTIONS file for the copied structure.

AD-A160 605 INTERACTIVE GRAPHICS UTILITY FOR ARMY NEC (NUMERICAL ELECTROMAGNETICS COD.) (U) SYSTEM DEVELOPMENT CORP SAN DIEGO CA J STRAUCH ET AL. SEP 85 NOSC-CR-308  
UNCLASSIFIED N66001-83-D-0094 F/G 9/2

INTERACTIVE GRAPHICS UTILITY FOR ARMY NEC (NUMERICAL  
ELECTROMAGNETICS COD.) (U) SYSTEM DEVELOPMENT CORP SAN  
DIEGO CA J STRAUCH ET AL. SEP 85 NOSC-CR-308  
N66001-83-D-0094 F/G 9/2

2/2

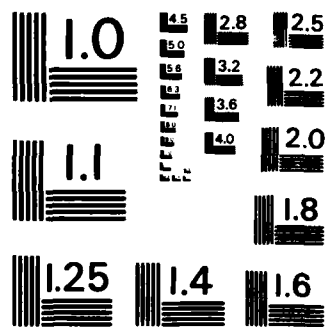
UNCLASSIFIED

F/G 9/2

NL

ENC

4.15 MEG



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS - 1963 - A

#### 5.3.2.2.2.2 Edit SECTIONS File

##### Function

This option allows the user to selectively edit any (or all of the section End Views) stored in the SECTIONS file for a given model. Edit functions are the same as those described in Section 5.3.2.1.1.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Select the SECTIONS file from the status display (press <F2>).

Press <F2> from the Sub-Option Menu (EDIT FILE).

##### Operation

The operator is prompted to enter the number of the section to be edited or <Return> to edit all (displayed for editing sequentially).

Edit functions are described in Section 5.3.2.2.1.1, step 1.

#### 5.3.2.2.3 3-D SECT NO EDIT File Operations

##### Function

The 3-D SECT NO EDIT file is generated by the system (see Section 5.3.2.2.2.1) from the End Views saved in the SECTIONS file for a given model. Only one function other than DELETE FILE can be performed on this file:

- a. EDIT FILE - the user is presented with the 3-D (unedited) views of each section for the specified model (one at a time). The section can be edited to add lines and delete unwanted points and lines. Zoom and plot functions are also available to aid in the editing process.

### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Select the 3-D SECT NO EDIT file by pressing <F3> from the file status display.

#### 5.3.2.2.3.1 Edit (Unedited) 3-D SECTIONS File

### Function

This option enables the user to examine (on the screen) each of the 3-D sections generated as described in Section 5.3.2.2.2.1 and to rotate the screen figure so that it can be edited for unwanted points and lines. This is almost always necessary because, if Top, Side, and End Views have been correctly input, there will be more wires in the structure than needed. Missing lines may be added to the 3-D sections as long as the end points for these lines are present. A missing line is usually an indication that there is at least one error in the Top, Side, or End View. This Add Line capability saves the user the trouble of having to back up and correct earlier errors in other views.

### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Select the 3-D SECT NO EDIT file from the status display (press <F3>).

Press <F1> (EDIT FILE) from the Sub-Option Menu.

### Operation

- a. An unedited section is displayed on the screen. The user may rotate this display (see Section 5.3.2.2.5.1 for description of rotation). The sections are presented as generated - no symmetry is applied.

- b. Rotate the displayed figure so that its configuration is optimally visible. Press <End> when done rotating.
- c. At the bottom of the screen the user is presented with the options of adding, deleting, plotting, or rotating.
- d. To add a line, select Option 1.
  - 1. Cross hairs are put up on the screen. Use the procedures described in Section 4.2.3 to position the cross hairs center where the new line is to start (any point in the section).
  - 2. When the cross hairs have been properly positioned, press either of the two mouse buttons to hook the point at the cross hairs center.
  - 3. The user is then prompted to HOOK OTHER END. Position the cross hairs center on the other end point and press one of the mouse buttons.
  - 4. If points have actually been hooked, the specified line is added to the section view.
  - 5. Press <End> to redisplay the Edit Menu when done with the Add option.
- e. To delete a point or line, select Option 2.
  - 1. Cross hairs are put up on the screen. Use the procedures described in Section 4.2.3 to position the cross hairs center on the point or line to be deleted.
  - 2. When the cross hairs have been properly positioned, press either of the two mouse buttons to hook the point or line to be deleted.
  - 3. Make sure this is the point or line to be deleted and press the <Del> to delete it.
  - 4. If a point has been hooked, that point and any lines connected to it are deleted from the section view. The point is still available as an end point for adding a line. If a line has been hooked (away from the end points), that line is deleted from the section view.
  - 5. When done deleting wires, press <End> to redisplay the Edit Menu.
- f. To plot the section view as displayed on the screen, select Option 3.
- g. To rotate the view, press <Return>.
- h. When done with all edits for this section, press <End>. All stray points are deleted at this time.

The edited 3-D sections are saved in the 3-D SECT EDITED file, awaiting model generation.

#### 5.3.2.2.4 3-D SECT EDITED File Operations

##### Function

This file is generated during the EDIT FILE function for the 3-D SECT NO EDIT file (Section 5.3.2.2.3). The only operation that can be performed on this file (except DELETE FILE) is:

- a. GENERATE 3-D MODEL - This is the goal that has been worked toward all this time. The system takes each of the 3-D (edited) sections stored in the 3-D SECT EDITED file for a given model and "sticks" them together at the predefined section boundaries (Section 5.3.2.2.4.1).

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Select the 3-D SECT EDITED file by pressing <F4> from the file status display.

##### 5.3.2.2.4.1 GENERATE 3-D MODEL

The system takes each of the edited 3-D sections stored in the 3-D SECT EDITED file for the specified model and sticks them together end-to-end as defined by the section boundaries. The entire 3-D model is figuratively "shoved in a shoebox" and shifted as close to the coordinate system origin as possible. All point coordinates and wires are now saved in the MODEL file for this structure.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Select the 3-D SECT EDITED file by pressing <F4> from the file status display.



Press <F1> (GENERATE 3-D MODEL) from the Sub-Option Menu.

### Operation

No user interface is required.

#### 5.3.2.2.5 MODEL File Operations

### Function

A MODEL file is generated via the GENERATE 3-D MODEL function (described in Section 5.3.2.2.4.1) and is the end result of all previous operations. The following functions are available for any MODEL file:

- a. LOOK AT FILE - This function allows the user to display the model, view the model on any of the three planes, rotate the picture, zoom, and plot the model.
- b. EDIT FILE - By using this function, the completed model can be edited to add wires, delete unwanted wires and/or to reportion the finished structure.
- c. COPY FILE WITH NEW NAME - The user can copy a MODEL file to a new file with a new name.
- d. GENERATE GEOMETRY DECK - This function is used to generate wire cards for all wires in a completed model. These cards are then used to build a complete input data set.
- e. ASSEMBLE MODELS - This function allows the user to create models from large drawings which are too large for digitizer input.
- f. RE-SORT MODEL - This function allows the user to specify the direction of wire sorting before generation of Geometry Cards.

### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be worked with.

Select the MODEL file by pressing <F5> from the file status display.

#### 5.3.2.2.5.1 Look at 3-D MODEL File

##### Function

This option provides a flexible model viewing capability which allows the user to display the model on the screen, view the model on any of the three planes, rotate the picture in any direction around any of the three axes, zoom (on the center of the structure only), and plot the model.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select the model for viewing.

Select the MODEL file by pressing <F5> from the file status display.

Press <F1> (LOOK AT FILE) from the Sub-Option Menu.

##### Operation

- a. The selected model is displayed on the screen. At the lower left of the screen is an X, Y, and Z axis marked for picture scale. (Each axis is actually the same length - use this information when using the rotation function.)
- b. Rotation - use the following keys to rotate the coordinate system display into the position in which you wish to view the structure (also see Figure 5-15):
  - <Pg Dn> - rotate counter-clockwise around line-of-sight
  - <Pg Up> - rotate clockwise around line-of-sight
  - <←> - rotate left around line vertically perpendicular to line-of-sight
  - <→> - rotate right around line vertically perpendicular to line-of-sight
  - <↓> - rotate down around line horizontally perpendicular to line-of-sight
  - <↑> - rotate up around line horizontally perpendicular to line-of-sight

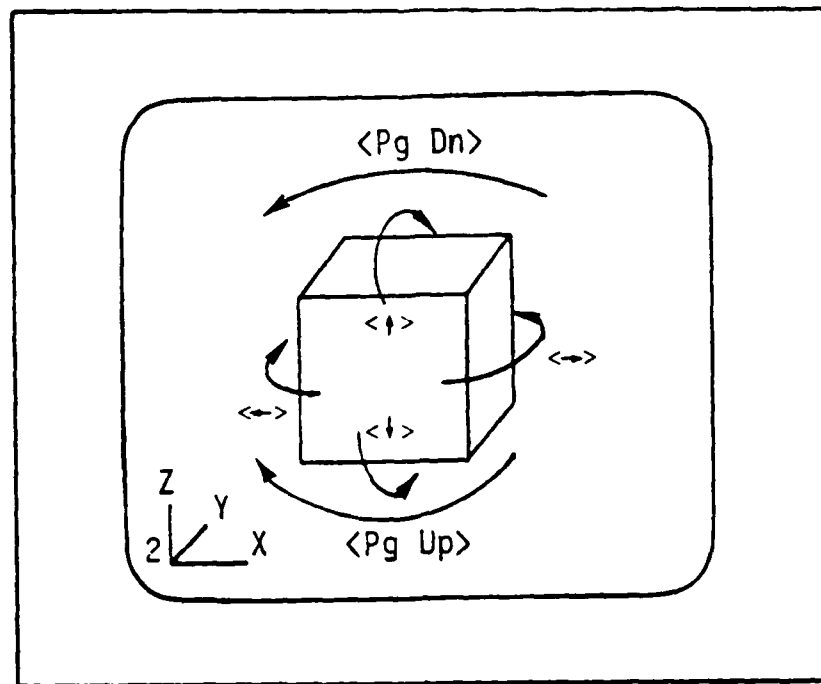


Figure 5-15. Rotation Control

- <X> - view Y-Z plane from positive end of X axis (End View)
- <Y> - view X-Z plane from negative end of Y axis (Side View)
- <Z> - view X-Y plane from positive end of Z axis (Top View)
- <Return> - when the coordinate system has been rotated to your satisfaction, press <Return> to display the rotated picture
- <End> - stops rotation process to allow plotting and exit
- <Home> - redisplay starting view and normal scale
- c. Zooming - when using the LOOK AT file function, the user can zoom the displayed view around its center with the following keys:
  - <D> - doubles the picture size each time it is pressed
  - <Back Space> - returns to the original (non-zoomed) size, retaining current view
- d. Plotting - align paper in the plotter as shown in the plotter manual. Use a sturdy, relatively nonporous paper for best results (copier paper is satisfactory). The picture that is plotted is as large as

will fit on the plotter paper and still get the whole structure on the paper. Press <1> to plot the displayed model. To create a plot with the wire ends marked and the wires numbered, press <2>. The wire numbers correspond to the sequence of the 'GW' cards generated by this model.

NOTE: Zooming does not affect plotting - the whole structure is always plotted, regardless of what is shown on the screen.

- e. Exiting - To return to rotating and zooming the model, press <Return>. To return to the Initial Options Menu, press <End>. To return to the Model Menu for the current model, press the cursor down key <↓>.

#### 5.3.2.2.5.2 Edit 3-D MODEL File

##### Function

The completed model can be edited to add wires, delete unwanted wires, and/or to repropotion the finished structure using this option. Zoom, rotation, and plot functions are also available to aid in the editing process.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select the model to be edited.

Select the MODEL file by pressing <F5> from the file status display.

Press <F2> (EDIT FILE) from the Sub-Option Menu.

##### Operation

- a. REPROPORTIONING - the user can change the length, width, or height of the structure, as desired.

1. The current dimensions of the model (X = length, Y = width, Z = height) are displayed. To change any or all of the structure dimensions, press the following keys:
  - <1> - change X dimension (length)
  - <2> - change Y dimension (width)
  - <3> - change Z dimension (height)

2. When a dimension is selected for change, the user is prompted to:

ENTER NEW DIMENSION IN METERS

3. Enter the new dimension, followed by <Return>.
  4. Select another dimension for change or press <End> if done re-proportioning the model.
  5. The model is then displayed on the screen (in its new proportions, if any) and the user can rotate and/or zoom the picture so it is optimally displayed for editing.
- b. ROTATION/ZOOMING - Refer to Section 5.3.2.2.5.1 for description. Zooming occurs at the cross hairs center during the model edit function. Use the mouse to position the cross hairs for zooming. When done with rotation and zooming, press <End> to switch to the EDIT mode.
  - c. EDIT Mode - The user may add or delete wires on the model. If the plotter is available, the model may be plotted. Additionally, the user may return to rotating and/or zooming the model.
  - d. ADD WIRE - Press <1> to add a wire to the displayed model.
    1. Cross hairs are put up on the screen. Use the procedures described in Section 4.2.3 to position the cross hairs center where the new wire is to start (on any point or line in the structure).

NOTE: Use the zoom feature to make cross hairs positioning easier.

2. When the cross hairs have been properly positioned, press either of the two mouse buttons to hook the point at cross hairs center.
3. The user is then offered a choice between using an existing end point or defining a new end point:

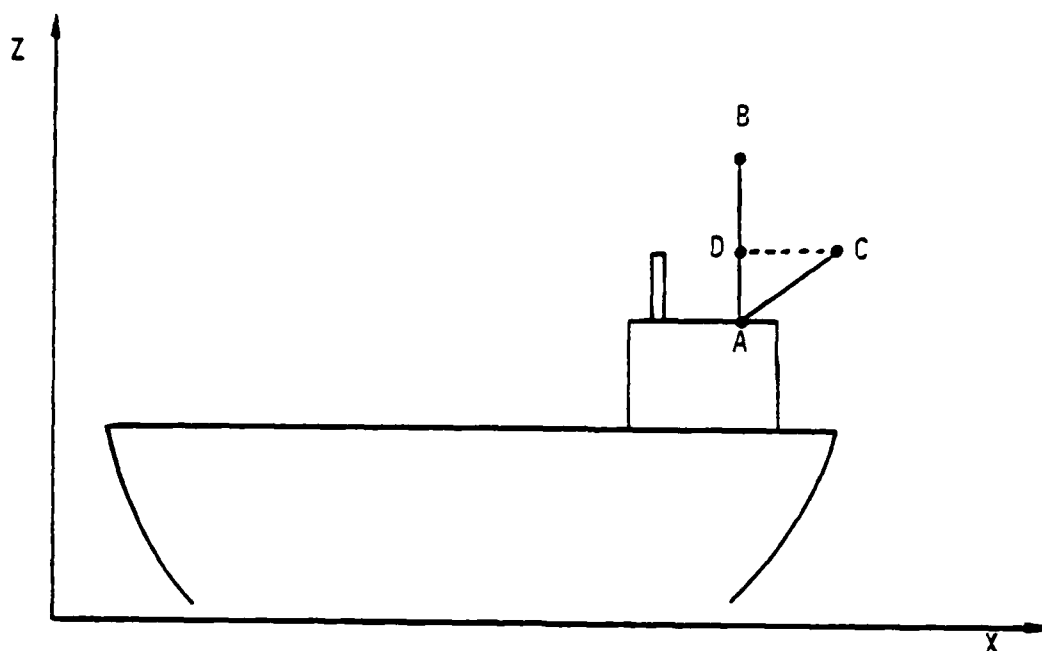
- a) NEW END POINT - the user is prompted to specify in which direction from the hooked position the new wire is to be drawn. Choices are X, Y, and Z only. After specifying wire direction, the user is asked for wire length. Enter length in meters (positive or negative).

NOTE: If a wire in other than the X, Y, or Z direction is required, wires must be added in a stepping pattern to reach the end point of the wire wanted. Use the EXISTING END POINT function to add the wire, then delete all wires used to step to the end point (see Figure 5-16).

- b) EXISTING END POINT - The user is prompted to position the cross hairs at the point to which the current point is to be connected with a wire. Do so and press one of the mouse buttons.
- 4. If points have actually been hooked, the specified wire is added to the structure.
- 5. Press <End> to redisplay Edit Menu when done with ADD option.
- e. DELETE WIRE - Press <2> to delete wire (DELETE WIRE is also used to delete a single point if a point instead of a wire is hooked).
  - 1. Cross hairs are put up on the screen. Use the procedures described in Section 4.2.3 to position the cross hairs center on the point or wire to be deleted.

NOTE: Use the zoom feature to make cross hairs positioning easier.

- 2. When the cross hairs have been properly positioned, press either of the two mouse buttons to hook the wire or point to be deleted.
- 3. Make sure this is the point or wire to be deleted and press the <Del> key to delete it.
- 4. If a point has been hooked, that point and any wires connected to that point are deleted from the structure. If a wire has been hooked (away from the end points), that wire is deleted from the structure.



To add wire AB: hook point A with cross hairs  
 choose NEW END POINT function  
 specify Z direction  
 specify length of AB in meters

To add wire AC: hook point A with cross hairs  
 choose NEW END POINT function  
 specify Z direction  
 specify length of AD in meters  
 hook point D with cross hairs  
 choose NEW END POINT function  
 choose X direction  
 specify length of DC in meters  
 hook A with cross hairs  
 choose EXISTING END POINT function  
 hook C with cross hairs  
 use DELETE WIRE option to delete wire DC

} not necessary if  
 wire AB already  
 added

Figure 5-16. Adding Wires to a Structure

NOTE: All stray points are deleted upon exit.

- 5. When done deleting wires, press <End> to redisplay Edit Menu.
- f. PLOT MODEL - If the plotter is available, press <3> to plot the displayed model. To create a plot with wire ends marked and wires numbered, press <4>. The wire numbers correspond to the sequence of the 'GW' cards generated by this model.
- g. EXIT - To return to rotating and zooming, press <Return>. To return to the Initial Options Menu, press <End>. To return to the Model Menu for the current model, press the cursor down key <↓>.

#### 5.3.2.2.5.3 Copy 3-D MODEL File With New Name

##### Function

This option allows the user to copy a MODEL file to a new file with a new name. This is particularly useful if a new structure is to be generated which is just slightly different from the original. Only the MODEL file - not the four preceding files - is copied.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Select model to be copied.

Select MODEL file for copying by pressing <F5>.

Press <F3> (COPY FILE WITH NEW NAME) from the Sub-Option Menu.

##### Operation

- a. The user is prompted for entry of a new name for the MODEL file to be created; enter up to 20 characters for the new model name.
- b. The selected model is copied to a new file with the specified new name. Any of the sub-options described in Section 5.3.2.2.5 can be used on this new file.



#### 5.3.2.2.5.4 Generate Geometry Deck

##### Function

This option is used to generate wire cards for all wires in a completed model. These cards are then used to build a complete NEC input data set (deck) via the CARD EDITOR function.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Specify the model for which wire cards are to be generated.

Select the MODEL file from the file status display (press <F5>).

Press <F4> (GENERATE GEOMETRY DECK) from the Sub-Option Menu.

##### Operation

- a. The user is allowed to shift the model along any of the axes or to center the model on the X and Y axes. The user is also allowed to change the default values to be used for the generation of this set of wire cards ('GW' cards). These values are wire radius, segments per meter, tag start, tag increment, and the 'GE' card parameters (see NOTE 2, below).
- b. Next, the user is prompted for entry of a name for the Geometry deck to be generated; enter any 10 characters for a name. If the name has already been used for another deck, the user may choose to overwrite the old deck with this new one or to enter another name.
- c. The system automatically generates a 'GW' card for each wire in the selected model in the order in which the wires have been sorted (see Section 5.3.2.2.5.7). Wire tagging, segmentation, and radius are based on the currently established values in the Defaults file. The end points of all wires are specified in terms of metric coordinates in floating point format.

NOTE 1: All wires are expressed in units of meters based on the user-specified scale. This scale can be changed via CARD EDITOR Option 2.2 (Section 5.3.1.2) by inserting a 'GS' card in the deck just generated.

NOTE 2: The last card image in the generated deck is 'GE'. It contains three parameters: ground plane, output option, and IRESRV.

#### 5.3.2.2.5.5 DELETE FILE

This option is described at the beginning of this section (Section 5.3.2.2).

#### 5.3.2.2.5.6 Assemble 3-D Models

##### Function

This option provides the user with the capability of creating models from drawings which are too large for digitizer input. The large drawing must be broken up into several smaller drawings, each of which must be entered as a separate model. This option, then, allows the user to assemble these models into a single structure.

NOTE: This function is also useful for duplicating substructures to produce a structure consisting of several identical substructures.

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Specify model to start working with.

Select MODEL file by pressing <F5> from the file status display.

Press <F6> (ASSEMBLE MODELS) from the Sub-Option Menu.

##### Operation

IMPORTANT: It is the user's responsibility to ensure that the models actually can be assembled - the program has no way of telling.

When specifying the models to be assembled, select in the following order:

1. left to right for long structures
  2. bottom to top for high structures
  3. front to back for wide structures
- 
- a. Enter, when prompted, the name of the model to be assembled to this one.
  - b. Enter, when prompted, the name for the new assembled structure.
  - c. Enter, when prompted, the axis to assemble along (X, Y, or Z).
  - d. The two models are displayed according to the assembly order (specified above) and the specified axis of the assembly. Points from the right side (top side, or back side) of the first model are to be matched with points on the left side (bottom side, or front side) of the second named model.
  - e. Points on the first specified model (the base model) are indicated with a "0"; points on the second (joined) model are displayed with a "+". (Only those points on the selected plane of assembly are displayed.) A marker, or spot, is placed on one of the points on the base model. Press the <Return> key to hop this marker around the base model points until it rests on the point to be joined to the second model.
  - f. Press <H> to hook the point of assembly in the base model. Verify the point selection by entering Y in response to the displayed prompt. (Enter N to reselect the base point of assembly.)
  - g. Use the same process (described in e. and f., above) to select the point of assembly in the second model.
  - h. Once the two points of assembly have been selected, the system attempts to line up the two models based on these selected points and the plane of join. The resulting point alignment is displayed on the screen and the user is prompted to press <End> to save this model or <Return> if the resulting alignment was unsatisfactory (<Return> allows the user to retry the assembly from step e.).
  - i. Repeat the entire assembly process until all pieces of the desired larger model have been assembled to form one new model. When models are assembled, only the model file is created (no intermediate files are generated). Only those functions available for model files can be

used with models which have been created via the model assembly process.

HINTS: It will take several attempts at using the model assembly function before it becomes "easy to use." Naturally, the assembly process will be easiest when there are fewer points on the two models to be lined up; for example, adding a cap to the top of a pole. When assembling complex structures, such as the bow and stern of a ship, there can be many points of join. The user will want to select two points which will cause the two models to line up in the best way (usually towards the center of the two models). Although the system does some automatic alignment trying to best fit the two sections together, they will not always line up exactly. The user may have to exit the assembly process and use the EDIT 3-D MODEL function to change the dimensions of one of the parts before returning to the assemble models process. Another possibility is to increase the point tolerance (see SET DEFAULT VALUES, Section 5.3.3) so that automatic alignment will produce a better fit.

#### 5.3.2.2.5.7 Re-Sort 3-D Model

##### Function

This option allows the user to specify the direction of wire sorting before generation of Geometry Cards. (NEC runs faster on sorted wires.)

##### Access

Press <F2> from the MODEL MAKER Option Menu (WORK WITH OLD MODEL).

Specify the name of the model to be sorted.

Select the MODEL file from the file status display (press <F5>).

Press <F7> from the Sub-Option Menu (RE-SORT MODEL).

### Operation

The user is prompted to select the direction of the sort:

up X axis	down X axis
up Y axis	down Y axis
up Z axis	down Z axis

The model is centered on the origin while the system spirals counterclockwise in the specified direction, arranging wires in the model file based on the midpoint values of each.

OF INTEREST: Sorted wires are observable when plotting.

#### 5.3.2.3 Option 3 - BUILD MODEL FROM GEOMETRY CARDS

### Function

This option allows the user to create a 3-D model from a NEC data set of Geometry Cards. To use Option 3, the NEC data set must be available in the IGUANA directory as a sequential file with an extension of ".NEC". Any Transmit Data Set (a NEC input data set) prepared via the IGUANA CARD EDITOR function can be used to create a 3-D model. For data sets generated on other computers, the card images must be downloaded (using a modem and modem program) to the IGUANA system and given a filename with the ".NEC" extension.

### Access

Press <F3> from the Option Menu.

The user is prompted to specify the name of the data set to be used:

NEC Dataset Name (.NEC)

Type in the name of the data set (without the extension) and press <Return>.

The user is then prompted to enter the name for the new model:

ENTER NEW MODEL NAME or <Return> TO SCAN MODELS

The model will then be created. Program control is automatically transferred to the 3-D Model Edit function.

#### 5.3.2.4 Option 4 - ARCHIVE/RESTORE MODELS

##### Function

This option allows the user to save models on a floppy disk (diskette), delete these archived models from the main (system) disk, if desired, and restore previously archived models onto the system disk. To use Option 4's Archive function, a formatted diskette must be on hand. See Section 5.3.1.9 on how to format a diskette. To use Option 4's Restore function, the user must have a diskette that has already been used to archive models.

##### Access

Press <F4> from the Option Menu.

The user is prompted to specify the operation to be performed:

##### ARCHIVE FUNCTIONS

- 1 - WRITE MODEL(S) TO FLOPPY DISK
- 2 - RESTORE MODEL(S) FROM FLOPPY TO FIXED DISK

Press the function key corresponding to the sub-option choice desired.

5.3.2.4.1 Writing Model(s) to a Floppy Disk (Archiving). When Sub-Option 1 is selected from the Archive Function Menu, the names and file types for each of the existing models are displayed on the screen (to see more, use the <Return> key). The user is prompted to select the model(s) to be archived. See Section 5.3.1.9.1 on how to select and deselect models for archiving.

When all selections have been made, press the <End> key to start the archiving process.

A formatted diskette must now be loaded into the floppy drive (drive A:). The user is prompted to indicate when the diskette is ready for archiving:

Place FORMATTED Diskette in Drive A:

Select which file types to save (A=All)

1 - 2-VIEW, 2 - SECTIONS, 3 - 3-D SEC NO EDIT, 4 - 3-D SEC EDIT, 5 - MODEL

Press <Return> when READY

(Press <Esc> to ABORT)

If the <Esc> key is pressed, no archiving is performed; the Archive Function Menu is redisplayed.

The user types the numbers of the file types that are to be archived, e.g., to save the 2-VIEW and MODEL files, 15 is typed. A maximum of 112 file names can be put into the diskette directory, so additional formatted diskettes should be available in case needed. When the <Return> key is pressed, model archiving begins. As the selected decks are being read from the fixed disk and written to the floppy disk, the screen display shows the current model name and file type.

The user may then delete or save the archived models as described in Section 5.3.1.9.1. Deleted models are completely removed from the system disk, no matter which file types were archived.

5.3.2.4.2 Restoring Model(s) to the Fixed Disk. This procedure is completely analogous to the Restoring Deck(s) function as described in Section 5.3.1.9.2.

5.3.3 Set DEFAULT VALUES Function. This function allows the user to set system default values for use in the generation of wire cards, a digitizer point entry tolerance value for delimiting digitizer point entry, and the system hardware configuration (equipments available).

#### Function

The SET DEFAULT VALUES function allows the user to set the values to be used as defaults during system execution. The values to be set are:

- a. Default Wire Radius - this is entered in meters and is used during the GENERATE GEOMETRY CARDS function to specify the wire radius on each of the 'GW' cards generated for the specified structure.

- b. Segments per Meter - when wire cards are generated, the number of segments for each wire is calculated based on the default value entered here. If wires are not to be segmented, enter -1.
- c. Tag Start Value - the user can specify a number with which to start automatic tagging (putting sequential tag numbers on 'GW' cards during the GENERATE GEOMETRY CARDS function). A starting tag number of -1 indicates no auto tagging.
- d. Tag Increment - if automatic tagging has been specified (see above) the user must also specify a tag increment. This value will be used to add to the previous tag number to determine the tag number for the next 'GW' card. If auto tagging has been deactivated (Tag Start = -1), this has no meaning.
- e. Point Entry Tolerance - VERY IMPORTANT FOR DIGITIZER INPUT. The user must carefully determine the best tolerance value for the particular drawing being input via the digitizer - BEFORE STARTING DIGITIZER INPUT! This value is expressed in terms of digitizer units and specifies the minimum distance between two points such that these two points will be distinguished as separate.
- f. System Configuration - the user must specify which of the following equipments are available for use:
  - 1. Digitizer
  - 2. Plotter
 Additionally, the installation label for plots must be specified.

#### Access

Select Option 3 from the Master Menu (SET DEFAULT VALUES).

The current default values are displayed on the screen, as shown:

.01	1 - WIRE RADIUS (METERS)
1	2 - SEGMENTS PER METER
1	3 - TAG START
1	4 - TAG INCREMENT
METERS	5 - UNITS USED IN ORIGINAL DRAWING
10	6 - POINT ENTRY TOLERANCE IN DIGITIZER UNITS
YES	7 - DIGITIZER AVAILABLE
FAST	8 - PLOTTER SPEED/AVAILABLE
	9 - INSTALLATION (LABEL FOR PLOTS): IGUANA



## Operation

Once the current default settings have been displayed, select the item(s) to be changed by pressing the function key corresponding to the item number and enter the new value(s) as described below:

### 1. CHANGE WIRE RADIUS

Press <F1>. The cursor is positioned atop the current wire radius setting. Enter the new value for the wire radius (in meters) followed by <Return>. This value, then, will be used as the wire radius in each of the 'GW' cards generated during the GENERATE GEOMETRY CARDS function. Thus, it must be set before this function is called.

### 2. CHANGE SEGMENTS PER METER

Press <F2>. The cursor is positioned atop the current segments per meter value. Enter the new value for segments per meter followed by <Return>. This value is then used to calculate the number of segments in a wire for field 3 of each 'GW' card generated via the GENERATE GEOMETRY CARDS function. It must be set before this function is called.

NOTES: (1) The number of segments in a wire is calculated by multiplying the wire length (in meters) by the number of segments per meter set here. This number is rounded to the nearest integer, not to be less than 1.

(2) If a wire is shorter than 1 meter, the number of segments for this wire = 1.

(3) If no wire segmentation is desired, set SEGMENTS PER METER = -1; each generated 'GW' card will have 1 set as the number of segments, regardless of wire length.

### 3. CHANGE TAG START

Press <F3>. The cursor is positioned atop the current tag start value. Enter the new tag start value followed by <Return>. The first 'GW' card generated during the GENERATE GW CARDS function will use this value as the tag number for this wire. This value can also be used to generate a default tag number for the CREATE GEOMETRY DECK (prompted mode) option in the CARD EDITOR.

- NOTES: (1) If automatic wire tagging is not wanted, set TAG START = -1.  
(2) Do not use zero as the TAG START value.

#### 4. CHANGE TAG INCREMENT

Press <F4>. The cursor is placed atop the current tag increment value. Enter the new tag increment value followed by <Return>. The tag increment is used during the GENERATE GEOMETRY CARDS function and during the CARD EDITOR's GENERATE GEOMETRY DECK (prompted mode) option to calculate tag numbers for each 'GW' card (sequentially) - IF AUTO TAGGING HAS BEEN SPECIFIED (see above).

NOTE: If auto tagging is deactivated (TAG START = -1), TAG INCREMENT is ignored.

#### 5. CHANGE UNITS USED IN ORIGINAL DRAWING

Press <F5>. The units will cycle through METERS, FEET, and INCHES. This applies only to the digitizer input for the original drawings; units are always in meters after this.

#### 6. CHANGE POINT ENTRY TOLERANCE

Press <F6>. The cursor is positioned atop the current tolerance value. Enter the new tolerance value in digitizer units followed by <Return>. This value is used to distinguish between two points entered by the user via the digitizer to compensate for the digitizer pen resolution. A relatively large tolerance value will make digitizer input and editing much easier for the user. However, a large tolerance also limits the minimum distance between two entered points, as the program will "snap" two points together and call them one point if both fall within the tolerance set here. The way to figure the tolerance is to measure the distance on the drawing between two points having the smallest distance between them. (Measure in centimeters.) Digitizer tolerance is measured in hundredths of centimeters (1 digitizer unit = 0.01 cm). Using this information and Figure 5-17, calculate the digitizer tolerance required for the particular drawing.

NOTE: BE SURE TO SET DIGITIZER TOLERANCE BEFORE STARTING DIGITIZER INPUT!

A setting of 10 (= 0.10 centimeters) is usually a good value for keeping points separate, yet compensating for a reasonable amount of variance in digitizer pen position. Digitizer input must still be performed with a great deal of care.

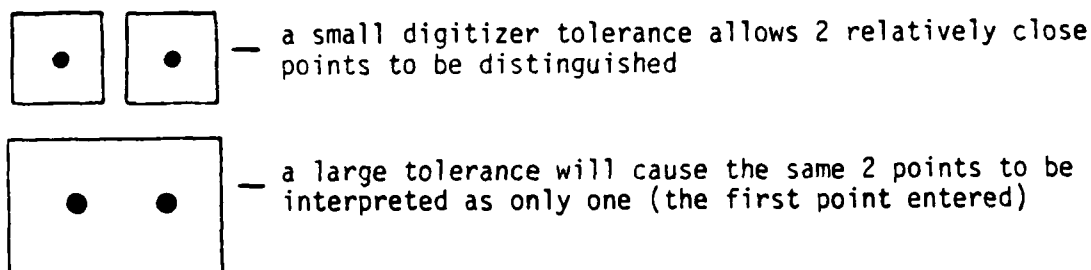


Figure 5-17. Digitizer Tolerance Illustration

7. CHANGE DIGITIZER AVAILABILITY STATUS

Press <F7>. The status will toggle between YES and NO.

8. CHANGE PLOTTER SPEED/AVAILABILITY STATUS

Press <F8>. The status will cycle through FAST, SLOW, and NO.

Status should be set to SLOW for plotting on transparency film or when using worn pens.

9. CHANGE INSTALLATION (LABEL FOR PLOTS)

Press <F9>. Enter the label to be printed on the plotter outputs, followed by <Return>.

5.3.4 CROSSTALK - Transfer Files to/from Another Computer. The NEC input data sets created via IGUANA must be sent to a mainframe computer for processing. Additionally, NEC results can be captured from a mainframe computer to the hard disk, edited (via EDLIN), and plotted using the Plot Utilities. These computer-to-computer file transfers are accomplished using a communications package, CROSSTALK-XVI, accessible from the Initial Option Menu.

CROSSTALK is a very powerful communications tool and can also be used independently of IGUANA by typing:

XTALK (Command File Name) <Return>  
optional

at the DOS level. Refer to the CROSSTALK-XVI documentation for an introduction to and detailed description of CROSSTALK. This document also provides operating instructions which the user will need to refer to in order to set up automated computer dial-up, log-on, and file transfer procedures discussed in this section and in Appendix A.

IMPORTANT: Before using CROSSTALK, make sure the digitizer/modem switch is set in the modem position; otherwise CROSSTALK cannot communicate with another computer.

### Function

CROSSTALK is invoked from IGUANA upon user request to enable computer-to-computer connection and communications. This function allows the user to specify that the Command file be loaded with CROSSTALK to begin automatic dial-up, log-on, and file transfer procedures, if any are desired.

### Access

CROSSTALK can be invoked by pressing Function Key 4 <F4> from the IGUANA Master Menu (Figure 5-1).

The user-maintained NEC Host Table is displayed on the screen and the user is prompted to:

ENTER INDEX OF HOST TO ACCESS  
SELECT HOST/FUNCTION - PRESS RETURN IF NO COMMAND FILE WANTED

Enter the number corresponding to the Command file to be executed with CROSSTALK, followed by <Return>. (The function keys will not work here.) To load CROSSTALK with no Command file, press <Return>.

CROSSTALK is loaded and the specified Command file (if any) is executed. When finished with CROSSTALK, return to CROSSTALK's Command Mode (Command ? appears

at the prompt at the bottom of the CROSSTALK screen) and type QU <Return>. The IGUANA Initial Option Menu is redisplayed.

Appendix A includes some sample Command and Script files. These samples plus the procedures described in the CROSSTALK documentation are used to create the user's own special purpose files. These Command file names are added to the NEC Host Table using CARD EDITOR Option 8 (DISPLAY/UPDATE NEC HOST TABLE).

Some important things to know when creating Command and Script files and using CROSSTALK:

- a. The telephone number(s) for the mainframe computer to be accessed
- b. The character sequence sent from the mainframe computer to the terminal to prompt for log-on
- c. The appropriate log-on sequence, user ID, and password
- d. The log-off sequence
- e. When a NEC input data set is prepared using IGUANA's CARD EDITOR Option 6.6, a sequential file is written to the disk with a user-assigned name. This is the name the user would include in a Script file which automated transfer of the NEC input deck to a mainframe computer.
- f. The NEC run job stream can be included in a Script file to automate not only the dial-up, log-on, and file transfer but to also submit the job for execution.
- g. NEC run results can be captured to the hard disk by CROSSTALK and then plotted using the Plot Utilities (see Section 5.3.4). The Plot Utilities require that the filename extension for data files be .NEC. Therefore, when capturing data, the filenames assigned to them must be of the form:

xxxxxxxx.NEC

It is important to note that Script files can only be created at the DOS level using a utility such as EDLIN. Command files are generated via CROSSTALK. This document does not provide instruction in using EDLIN and only minimally describes the creation of Script files. Refer to the DOS manual and the CROSSTALK-XVI documentation, as well as the samples included in Appendix A.

The user must create a Command file for each Command file name included in the NEC Host Table or CROSSTALK execution will fail.

5.3.5 Plot Utilities. These utilities provide a means to plot NEC input data sets and NEC run results.

#### Function

Plot Utilities are included with IGUANA to allow the user to plot NEC input and run results. These functions are accessible through the Plot Utilities Menu.

#### Access

To access the Plot Utilities, press Function Key 5 <F5> from the IGUANA Initial Option Menu. The Plot Utilities Menu is displayed on the screen.

This paragraph details the steps the user will need to take to prepare data for input to the Plot Utilities. Data preparation must be accomplished BEFORE entering the Plot Utilities Menu.

- a. Preparing a NEC Input Data Set for Plotting. The first utility is capable of displaying, rotating, and plotting the three-dimensional structure defined in an input data set. Objects of up to 200 wires can be plotted. Surface patches and Green's Function are not currently implemented and will be ignored. The NEC input data sets can be those prepared via IGUANA (Option 6.6) or any input data resident on a mainframe computer which is captured to the hard disk by way of CROSSTALK. The data sets must be prepared (using EDLIN in the case of transferred files or the IGUANA Prepare Deck function for IGUANA-generated data sets) as follows:
  1. Make sure that no "garbage" is present in the data set, especially at the beginning and end of a transferred file. (Some system commands are captured with the file during the file transfer process.)
  2. The filename for the data set to be plotted must be of the form  
xxxxxxx.NEC

Files being captured from a mainframe computer can be named with the .NEC extension when the captured file is saved on disk (see

CROSSTALK manual)). IGUANA-generated input decks, however, must be prepared as if they were being sent to the mainframe computer for processing (CARD EDITOR Option 6.6). The prepared deck is saved as a sequential file named by the user with a filename extension of the .NEC.

- b. Using the Graphical Plotting System (GRAPS). A wide range of plot utilities is available in the Graphical Plotting System (GRAPS). For more information see NOSC TD \_\_\_\_\_ (to be published).

5.3.6 Auxiliary Programs. A sub-menu has been created for MININEC and other miscellaneous programs. The user may add his own programs to this sub-menu for easy access. MININEC is a stand-alone computer program which can be accessed via the IGUANA Master Menu for the user's convenience.

#### Function

MININEC is a methods of moments code for the analysis of thin wire antennas and is used to solve for impedance and currents on arbitrarily oriented wires, including configurations with multiple wire junctions. Options include lumped parameter impedance loading of the wires and calculations of far field patterns in free space and over a flat, perfectly conducting, infinite ground plane. The MININEC Technical Document (see Section 2.2) provides more detail on the background, philosophy, purpose, and operation of MININEC.

Included with the Auxiliary Programs are a MININEC Pre-Processor to process the Geometry Cards of a NEC Input Data Set through MININEC, a MININEC Post-Processor to interface the MININEC output with the Plot Utilities, and an Antenna Network Matching Program which produces Smith Charts.

#### Access

MININEC is invoked by pressing <F6> from the IGUANA Master Menu (Figure 5-1) and then pressing <F1> from the Auxiliary Programs Sub-Menu. Miscellaneous user programs may also be added to and accessed from the sub-menu.

To add programs to the sub-menu, follow these steps:

- a. Press <F7> from the Initial Option Menu to exit to DOS.
- b. Type "CD \MISC" to access the Miscellaneous Programs sub-directory.

- c. Copy your program into this sub-directory using one of these commands:

```
COPY A:(program.ext)      (from diskette)
COPY \(\dir)\(program.ext) (from your sub-directory)
COPY \(\program.ext)      (from main directory)
COPY \IGUANA\(\program.ext) (from IGUANA directory)
```

where anything appearing in parentheses is a user-defined name. For example, COPY \(\dir)\(program.ext) will look for the specified program name (program.ext) in the user's own sub-directory (dir) on the default drive (the system disk is C:) and copy it into the Miscellaneous Programs sub-directory, "MISC," also on the default drive.

- d. Add your program to the sub-option menu as follows (system prompts are underlined):

```
>EDLIN MENU      (call line editor)
*L              (see what the file looks like)
*#I             (insert at end of MENU file)
  n:"(program description)", "(program name)"
```

Enter a description and name for each program being added to the Auxiliary Programs Sub-Menu.

```
  n:<Ctrl-Break> (to exit insert mode)
*E              (to exit EDLIN)
```

What has been entered in the program description field will appear on the Auxiliary Programs Sub-Menu and "program name" is the name of the program to be executed when that option is selected from the sub-menu. If an uncompiled Basic program is to be run, "program name" should be "BASICA program name" and the program itself should be terminated with "SYSTEM" (not "END").

- e. Type "CD \IGUANA", then "I" to return to the IGUANA directory and reload the Initial Option Menu.

5.3.7 EXIT TO DOS. At times it may be necessary to return to the DOS level to perform operations that are not supported through IGUANA or CROSSTALK. For



instance, to build a CROSSTALK Script file the user needs to exit to the DOS level and use EDLIN to create the file. Script file edits are also performed from the DOS level.

After returning to the DOS level, refer to the DOS manual provided with the PC for DOS functions and commands and instruction in the use of EDLIN.

## APPENDIX A

### CROSSTALK COMMAND AND SCRIPT FILES

CROSSTALK (the data communications package) can use special purpose files called Command and Script files to direct processing. These files are created by the user and include valid CROSSTALK commands which, when CROSSTALK is in control, are sequentially executed, thus providing a means to automate CROSSTALK operation. Much of the following information has been extracted from the CROSSTALK-XVI documentation.

#### Command Files

Since the same mainframe computers will be called often, it is convenient to create a Command file for each of these computers. Basically, a Command file is a list of commands stored in a disk file. CROSSTALK can load in and perform the commands contained in a Command file just as if the commands were entered from the keyboard.

Using Command files saves the user from having to enter the phone number, name, modem speed, function key settings, and other information for a particular computer each time that system is to be called. Instead, the user enters this information once and saves it in a Command file.

Command file names can be entered in the NEC Host Table (see CARD EDITOR Option 8) so that when the user wants to run CROSSTALK the Command file to be processed can be specified. When CROSSTALK is executing, the specified Command file will be loaded automatically and CROSSTALK will begin dialing the phone number in that file immediately.

Command files may contain any CROSSTALK commands. They generally contain all of the information that CROSSTALK needs to establish communications with another computer. In addition to these essentials, Command files contain all of the function key settings.

Command files can also pass control to another type of special purpose file called Script file (discussed later). See Figure A-1 for a sample Command file. Note that the last command in the file is a GO command. This causes CROSSTALK to begin dialing the phone when this file is loaded.

The easiest way to create a Command file is to use CROSSTALK's SAVE command. To create a Command file in this way, follow these steps:

- a. Invoke CROSSTALK (Function 4 on the IGUANA Initial Option Menu)
- b. Set the phone number for the computer to be dialed with the NU command
- c. Set the location name with the NA command
- d. Set any desired function keys with the FK command
- e. Set the desired modem speed with the SP command
- f. Change any other settings, as desired, (terminal emulation, type, parity, stop bits, etc.) with the appropriate commands (refer to the CROSSTALK manual)
- g. Enter the command:  
    SAVE filename  
    where filename is the name to be assigned to this Command file
- h. The Command file is now saved

Any number of Command files can be created in this manner; remember to add this information to the NEC Host Table (CARD EDITOR Option 8) for each Command file created.

Any combination of commands can be used in a Command file. If any command is incomplete (such as SPEED command with no baud rate), the program will request the missing information before proceeding.

### Script Files

CROSSTALK provides a means for users to write and run programs in CROSSTALK's own command language. These programs are called Script files and they add a great deal of flexibility to CROSSTALK. Script files are very similar to Command files. In fact, a Script file can be included in a Command file or it may be called from a Command file. The major difference between the two types of files is that Command files are normally used to provide parameters to tell CROSSTALK how to dial a particular computer, while Script files tell CROSSTALK what to do once the connection is made.

<u>COMMAND</u>	<u>FUNCTION</u>
NAME	NOSC VAX
NUMBER	223-217J
ACcept	Everything
ANSwack	On
ATTen	Esc
BReak	End
SWitch	Home
CWait	None
LWait	None
DEbug	Off
DPrefix	ATM0DP9,,T
DSuffix	
EMulate	VT100
Filter	-----++++-----
INfilter	On
LFauto	Off
MODE	Call
PORT	2
PWord	
TImeR	On
TURnarnd	Enter
BRsize	1
CAPture	Off
COMmand	ETX (^C)
DATA	7
DUPlex	Full
OUTfilter	On
PARity	None
PRinter	Off
SPeed	1200
STop	2
TABex	Off
BLankex	Off
UConly	Off
FK 1	"Userid "
FK 2	"password "
FK 3	"@QUIT "
FK 4	"@RWIND "
FK 5	"@CAPture / "
FK 6	"@PRinter / "
FK 7	"@Type "
FK 8	"@CAPture <24"
FK 9	"@SNap "
FK 10	"@SNap 24 "
GO	q13/20
	Set name to NOSC VAX
	Set phone number
	Allows caller to full access to system
	Send contents of FK 4 if <Control>E received from mainframe
	<Esc> key used to get CROSSTALK's attention - switches to Command mode
	Set <End> key as BREAK command
	Set <Home> key to switch between terminal and status screens
	No wait between characters when transmitting data to mainframe
	No wait between lines when transmitting data to mainframe
	Don't display incoming control characters
	Set dialing prefix for modem
	Set dialing suffix for modem
	Emulate VT100 terminal
	Discard incoming control characters
	Tells CROSSTALK not to issue a line feed after receiving a carriage return
	Tells CROSSTALK to make (as opposed to answer) calls
	Use the IBM's COM2 port for IO
	No answer password
	Display online connection time at lower right of screen
	Enter <Return> key used to indicate end of line
	File transfer data block=1 256 byte block
	Set capture mode off at startup
	<Control>C = character a caller would send to issue commands to your system
	Number of data bits = 7
	Set to full duplex (local echo off)
	Discard line feeds when sending text files to mainframe
	Set for no parity
	Don't echo screen data to printer
	Send/Receive at 1200 baud
	Set number of stop bits=2
	Turn TAB expansion off
	Don't convert blank lines to a space
	Enable both lower and upper case
	Values assigned to Function Keys
	.
	.
	.
	.
	.
	.
	.
	.
	.
	.
	.
	.
	Dial NUmber - if no answer retry in 20 seconds

Figure A-1. Sample Command File

Any CROSSTALK command may be included in a Script file; additionally, there are several commands which are useful ONLY in these files. Refer to the CROSSTALK manual for more details on valid Script file commands.

A Script file is a disk file consisting of one or more CROSSTALK commands. Script file names must have the file type (extension) .XTS. You can create a Script file with any text editor, such as the EDLIN program provided with DOS. Multiple commands may be placed on the same line as long as they are separated with a space, a colon, and another space. Commands in a Script file are performed in the order they appear in the file.

When CROSSTALK first connects to another computer, the program checks the current disk to see if a Script file exists with the same name as the currently loaded Command file. For example, if the user invoked CROSSTALK with a Command file named HOST1 (actually, HOST1.XTK) which dialed a given number and waited for connection to a computer, then when all commands in the Command file had been processed, CROSSTALK would look next for a file called HOST1.XTS. If the .XTS, or Script file, exists, CROSSTALK would automatically load and execute the commands in this file.

The number of Script files created is limited only by the amount of disk space available. Remember, however, that only 20 Command file names (and by association, Script files) can be stored in the NEC Host Table. Script files may pass control to other Script files, so that commonly used commands need not be repeated in several different files.

Before writing a Script file, it is recommended that the user has in front of him a printed copy of exactly what it is he wants to do. For example, if the user wants to write a Script file to call a CRAY, log in, and submit a job for execution, he will need to know exactly what questions and prompts are sent from the CRAY so that the Script file can wait for the prompt characters and respond with the appropriate sequences.

The easiest way to obtain a printed copy of such an exchange is to call the system first and either capture the session to a disk file or print it on the printer while online.

Figure A-2 is a sample Script file which logs on to the NOSC Code 81 VAX, sends the prepared NEC input data set (XMIT.NEC) to the computer and submits a NEC run request. The user ID and password in this example are not usable.

It is possible to have many more Command and Script files on the disk than can be accessed via the NEC Host Table. To use one of these files, invoke CROSS-TALK from the Initial Option Menu (Function 4) and hit <Return> in response to the Host selection prompt. After CROSSTALK has been loaded, programs LOAD and/or DO commands can be used to execute other Command and Script files. See the CROSSTALK manual for more details.

COMMAND	FUNCTION
AL 0 AL	Sets audible ALarm to 0 - no tone
WAIT DELAY 50	Wait for 5 seconds
REPLY	Send carriage return to host
WAIT DELAY 5	Wait .5 seconds
REPLY	
WAIT DELAY 5	
REPLY	
WAIT DELAY 5	
REPLY	
WAIT DELAY 5	
REPLY	
WAIT DELAY 5	
REPLY	
LABEL CALL	Label named CALL for repeated tries at calling the computer
	Wait .5 seconds
WAIT DELAY 5	Call NOSC VMS (Code 81) VAX
REPLY CALL 8333	When the mainframe sends the COMPLETED message, start the log-on procedure at label LOGIN
WHEN "COMPLETED" JUMP LOGIN	
	Wait 10 seconds
WAIT DELAY 100	Call not complete - try again from label CALL
JUMP CALL	
	Label LOGIN starts log-on procedure
LABEL LOGIN	Send carriage return to mainframe
REPLY	Wait for mainframe to send colon indicating Userid entry request
WAIT CHAR ":"	Send Userid, carriage return
	Wait for mainframe to send colon indicating Password entry request
REPLY Userid	Send password, carriage return
WAIT CHAR ":"	Wait for VAX prompt - log-on complete
	Send CREATE command to VAX
REPLY password	Wait for mainframe to send colon indicating filename request
WAIT CHAR "\$"	Send filename "NEC.DAT"
REPLY CREATE	Send IGUANA's data file "XMIT.NEC"
WAIT CHAR ":"	Send <Control>Z to mainframe
	Set up files for NEC run
REPLY NEC.DAT	.
SEND XMIT.NEC	.
REPLY ^Z	.
REPLY ASSIGN NEC.DAT FOR005	Start NEC run
WAIT CHAR "\$"	Suspend Script file processing until user enters the CROSSTALK DO command
REPLY ASSIGN NEC.OUT FOR006	Send log-off command to mainframe
WAIT CHAR "\$"	Wait for logged-off indicator
REPLY RUN NEC	Hang-up and disconnect
WAIT MANUAL	
REPLY LOGO	
WAIT CHAR "#"	
BYE	

Figure A-2. Sample Script File

## APPENDIX B

# SYSTEM INSTALLATION GUIDE

The IGUANA system is delivered to each site preinstalled on the fixed disk. This installation guide is to be used ONLY in the event that the fixed disk is accidentally destroyed and is no longer useable. The floppy diskettes provided with the system contain all IGUANA, CROSSTALK, PLOT and MININEC system programs. These diskettes are labeled.

- a. IGUANA1
- b. IGUANA2
- c. IGUANA3
- d. IGUANA4

The only data files included on these backup diskettes are the same sample files installed on the fixed disk when the system is delivered. ALL MODELS AND DATA SETS (DECKS) CREATED ON THE FIXED DISK WILL NOT BE RECOVERABLE! The only exception is that any subdecks archived on a floppy diskette via the IGUANA archive function can be restored onto the fixed disk after the system is reinstalled as described below.

\*\*\*\*\* DO NOT CONTINUE UNTIL READING THE ABOVE \*\*\*\*\*

To reinstall the system, follow the steps below:

- a. Install DOS on the fixed disk (drive C:) according to the instructions in the DOS Reference Manual.
- b. Place the floppy labeled IGUANA1 in the floppy disk drive (drive A:)
- c. Type: 

A:LOAD

(Press Return Key)
- d. Load IGUANA2, IGUANA3 and IGUANA4 diskettes when prompted to do so.
- e. When the preceding procedures have been completed, remove the IGUANA4 diskette from the A: drive and reboot the system by simultaneously pressing <Ctrl>, <Alt>, and <Del>. The system is now ready to be used.



NOTE: If NEC data sets (subdecks) have been archived on floppy diskettes via the system Archive function, this data can be restored to the fixed disk with the system's Restore function. Refer to the IGUANA User's Guide for procedures.

**END**

**FILMED**

**12-85**

**DTIC**